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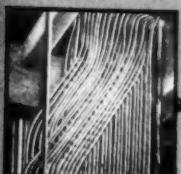
Electrical Contracting

With Which Is Incorporated
The Electragist

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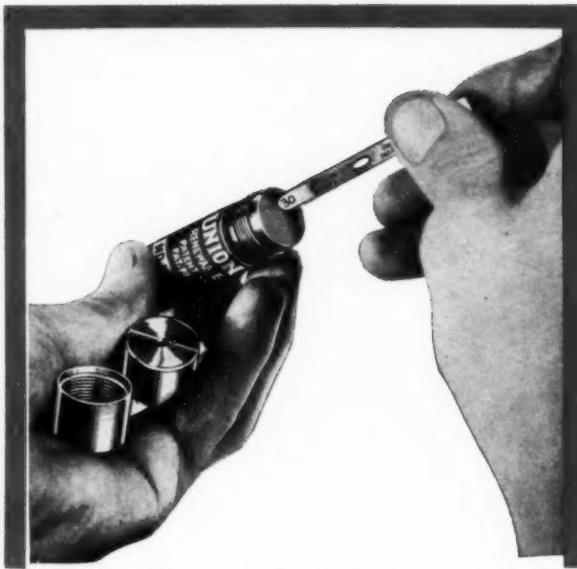


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Bellwood (Suburb of Chicago) Illinois

**JEFFERSON RENEWABLE
FUSES**

electrical contracting

VOLUME 31

WITH WHICH IS INCORPORATED THE ELECTRAGIST

NUMBER 10

S. B. WILLIAMS, EDITOR AND GENERAL MANAGER

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TO
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Steeltubes Job

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The popularity of Steeltubes is growing rapidly. Over 30,000,000 feet now installed. Contractors like it because of its easy handling, light weight, because there are no threads to cut... and because of the quality of the finished job.

Steeltubes is the pioneer threadless thin-wall tubing... developed expressly for the electrical industry... made from high quality tough openhearth steel... electrically welded. It pays to be sure that your customers know the facts about Steeltubes.



Above: The Epp Apartments, San Francisco, California. Architect, H. C. Bowmann. Electrical Contractor, David Grandi, San Francisco. Steeltubes supplied by the Westinghouse Electric Supply Co. *Below:* David Grandi.

Electrical Division, STEEL AND TUBES, INC., Cleveland, Ohio

(A UNIT OF REPUBLIC STEEL CORP.)

S T E E L T U B E S
T H R E A D L E S S T H I N W A L L C O N D U I T

today's need

FOUR years ago business was good—electrical contractors had all the business they could take care of comfortably. True, it may have been a sort of profitless prosperity, because few contractors charged enough for their work to make a legitimate profit.

At that time we felt that one of the greatest services this magazine could render to electrical contractors was to supply a resale price service containing suggested billing prices on the thousands of items used by the contractor so that the business obtained would be profitable business rather than just more business. ELECTRICAL CONTRACTING, pioneered in giving to the electrical contractor a service which it felt met the needs of the hour, and many of its subscribers have said that they have profited greatly from the use of the service and feel that they have learned what constitutes a fair price for materials.

THINGS have changed in four years. In line with our policy of anticipating the needs of the electrical contractor we are again going to pioneer. Therefore, commencing with this issue the major efforts of this magazine will be directed towards ways and means of obtaining new business for the electrical contractor, which in our

opinion is today's greatest need. Many contractors seem to think there is some mysticism about selling. Perhaps it would be better to say we are going to supply a practical sales service to show electrical contractors how they can increase their business by asking for the order.

There is a selling job to be done by every contractor if he expects to stay in business, and we are going to comb the country in an effort to obtain the best examples of aggressive selling that other contractors have used successfully to increase their business, so that our subscribers can go after business firm in their belief that what others have done they too can do.

IN substituting a "Sales Service" for the "Resale Price Service" we do not mean to infer that there is no longer a need for a price service, nor would we feel justified in abandoning such a service in ELECTRICAL CONTRACTING if it were not for the fact that there is still a resale price service available.

The "National Electrical Resale Price Service" published by the Henderson-Hazel Corporation, whose advertisement appears in this issue, supplies a comprehensive price service which is now the only resale price service on electrical supplies and appliances published in this country which aims to have national coverage.

ONE KEY to a reliable business

... reliable wiring supplies

A superior business cannot be built on inferior methods . . . Wise contractors know this. They know that the key to a reliable business is reliable workmanship, *plus reliable materials.*

Experienced contractors know that the difference between superior and inferior wiring supplies may be the difference between a lasting installation and costly breakdowns. Recognizing their responsibility, wise contractors forestall such undesirable breakdowns by installing only first-class materials.

On this basis, they are building

themselves the kind of substantial business that stands even the test of such times as these.



But the question arises:—How is one to identify good, bad and indifferent wiring supplies? They look alike. Even the experienced eye finds difficulty in telling these apart.

Experience has shown the best answer to be the reputation of the supplier . . . Graybar's reputation for *quality* electrical supplies goes back to the very beginnings of the electrical industry in this country.

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VOLUME 31
NUMBER 10

electrical contracting

WITH WHICH IS INCORPORATED THE ELECTRAGIST

AUGUST
1932

l'attaque au derrier

RECENTLY as I stood at the window, just looking, I noticed that a long ledge opposite was occupied by a row of pigeons, and that there was quite a commotion among them as they walked up and down the promenade.

About half the pigeons were young ones. They were afraid to fly and the old folks had evidently decided that the time had come for the kids to get out and hustle their own chow. A parent pigeon would walk over to a young one and tell it something. Getting no answer or action, pa or ma would draw back and hand the fledgling a healthy peck in the back of the head. If it still refused to take the air, another wallop followed and the youngster would look disgusted and flounder off in clumsy flight.

"Aha!" I says to myself, much amused and enlightened, "So that's what the French call 'l'attaque au derrier'—a boot from the rear. If it was good enough for Napoleon, it's O. K. for me and I'm going to try it to the limit on my men."

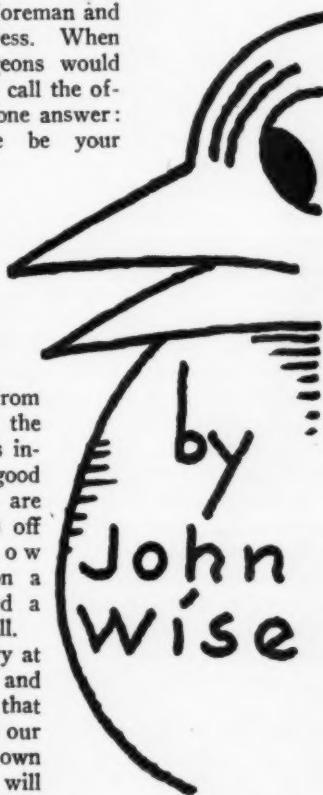


I have always had men with me who accepted responsibility, but they are about one in ten. At the time of the pigeon incident, I had four or five fellows who were good wiremen, honest and conscientious, but utterly lost without supervision. So I arranged a little frame-up with the foreman and the office girl, to put these boys on the spot for their own good. "It may have dynamite in it, and it may cost me some dough," I said, "But, believe me, these squabs of mine are going to use their wings or hit the cobblestones."

So I put each man on a job which I knew he could handle, but which would furnish plenty of situations requiring judgment and thought. Then I kidnapped the foreman and faded, leaving no address. When one of the young pigeons would get in a tight place and call the office, the girl had only one answer: "Let your conscience be your guide!"

Sure it went over-worked out just about as I expected; not perfect—some of the boys excelled the others, but there were no flarebacks and the jobs were done right. I even received a call from one builder, praising the man on his job for his intelligence. But the good part is that these boys are all busting the buttons off their shirts telling how John left them out on a limb and they knocked a homer with the bags full.

I told the whole story at our meeting last night, and the contractors agreed that the sooner we train all our men to stand on their own feet, the sooner we will graduate from the Wet-Nurse Brigade.



safe wiring for filling stations

BY O. F.
BURNETT, JR.
KELSO
BURNETT CO.
CHICAGO,
ILL.

protection of wiring for gasoline service stations with a minimum of cost.

Starting with circuit protection circuit breakers should be used everywhere in place of fuses. This does two things. It insures a constant and unvariable protection of all circuits to one limit only. If more load is added, which will overload the circuit, the circuit breaker will throw out until a new circuit is installed for the additional load. Secondly, it does not permit such practices as placing pennies back of fuse plugs, fixing a piece of solder across the ferrules of fuses, or reconnecting the device ahead of the fuse. As a matter of fact the antihoarding committee would do well to look behind fuse plugs for hoarded money. An official of one of the oil companies recently made a tour of a few hours to several stations on a hunt for treasure behind fuse plugs and the net result was eighty-five cents.

There are several makes of suitable breaker type switches and breaker type lighting and power distribution cabinets now on the market.

The second necessity for adequate protection is that each motor and power device be individually protected. This means each pump motor, air compressor motor, battery charger, etc. The National Electric Code permits the grouping of small motors under the protection of a single set of fuses if the rating of the fuses does not exceed 15 amp. and the wattage of the circuit does not exceed 1320 watts. If this practice is followed it is then possible for a $\frac{1}{4}$ or $\frac{1}{3}$ h.p. motor, which is the usual size of a dispensing pump motor, having a full load running current on 220 volt operation of 2.0 amp.

MUCH has been said and written about the necessity of selecting the proper type of lighting units, proper voltaged lamps, proper sized wires to eliminate losses, proper location of units for the best distribution of the light, but not so much has been said about the quality of the materials and workmanship behind the walls and under the ground.

There are many opinions as to what adequate protection is and how best to effect it. With this in mind the writer intends to express his own opinions as to what are very effective means of obtaining maximum

to 2.7 amp., to carry an overload from 500 to 700 percent before the fuse will blow out. This condition does occur on dispensing pump motors because of the nature of the application, and the writer has experienced much difficulty on this account until an individual circuit breaker for each motor was installed. An owner, in the long run will save many repair bills for burned out motors by individually protecting each motor with a small rating circuit breaker or thermal relay.

Small, reliable circuit breaker switches having ratings as low as 4 amp. 2-pole 220-volt and 1.75 amp. single pole, 110 volts of several makes are now available and should be used. The manufacturers of explosion resisting fittings are now listing approved fittings for the mounting of these switches in them.

The third requirement for adequate protection is a most important one and that is the use of explosion resisting equipment and fittings in hazardous locations. With the advent of the motor driven gasoline dispensing pumps Underwriters' Laboratory was faced with a serious problem. These pumps for gasoline contained a motor, a switch to turn the motor on and off, and a switch for the lights.

These devices when operated naturally created arcs across contacts and with the proper combination of air and gas fumes an explosion resulted. Some serious accidents and fires have occurred and are still occurring in these pumps due to faulty equipment and construction.

Only recently in Des Moines, Iowa, on almost three successive days at three different stations there occurred pump explosions. An investigation of these accidents showed that the explosion occurred when the attendant was returning the hose nozzle to its hanger on the pump. This hanger in turn operated the switch for the motor and in so doing caused a spark in the fitting, which was then filled with gasoline vapors at proper air mixture, and the ensuing explosion resulted.

Although this was a vaporproof fitting of a reliable manufacturer it was impossible to keep gasoline vapors out of it. The danger then lies in the fact that an explosion will occur and blow the cover off permitting the hot gases to leap out into the surrounding atmosphere and ignite the gases present there. The dangerous explosion will then follow.

Now the gases are permitted to enter the fittings which are designed so that the hot gases will be cooled before they can come in contact with the fumes outside of the fitting. Several manufacturers have designed and built such explosion resisting equipment for almost every purpose imaginable.

Inasmuch as these fittings, as well as motors, are now available all contractors should refuse to connect a pump, or hazardous device, until it is of the explosion resisting type and listed by Underwriters' Laboratories.

The fourth requirement concerns the underground wiring. Many of the oil companies are now learning, and rather expensively, that cheap first cost electric construction does not pay. The cheapest construction, in underground work especially, has been the vogue, but here is one example of why it does not pay.

One large oil company began to construct several service stations in a certain district. The construction department neglected to investigate the necessity for unusual construction and so permitted the use of code grade rubber covered wire in $\frac{1}{2}$ in. conduits underground and knockout type fittings out of doors. These methods were permitted because the immediate saving of a few dollars seemed quite advantageous.

For a few years everything operated fine without trouble and then things began to happen. Short circuits began to occur at an alarming rate. The knockout fittings began to deteriorate and fall apart and had to be repaired. The saved dollars of a few years back and a few more besides were spent for repair bills.

Something had to be done. Water was getting into their conduits and was ruining all their wiring. An inside wiring job could not be used outside. They must change their methods. Someone told them that they ought to use lead covered wire and threaded fittings. Also that all their conduit joints should be red leaded. This suggestion no doubt was the answer to their problems. So all installation methods were revised. Strict specifications and supervision were instituted in their construction department to follow out this plan. They began to pay attention to the advantages of good construction.

However, the strange thing about it all was that their troubles did not cease. The short circuits and electrolysis due to water in pipes continued and the maintenance cost was not reduced materially.

This situation brings us up to the present day when contractors and consumers are wondering what to do next. Here are some suggestions which have practically eliminated all the difficulties.

The solution can best be explained by pointing out a few causes. A large majority of the

water, perhaps 90 per cent of it, which gets into underground conduits does not get in from the outside. It comes from condensation of moist air circulating through the pipe. This condensation may occur during the summer in hot humid weather and it will remain in there until the cold weather sets in and then will freeze. The expansion of the freezing water also expands the wires and the break then occurs. The broken wire cannot be removed from the frozen pipe unless some sort of thawing outfit is employed, temporary wiring must be installed until spring arrives and the pipe thaws out naturally.

Temporary wiring should be avoided because of its nature it does not permit the use of explosion resisting methods and also an additional operation is necessary to replace it with permanent wiring at a later date.

This same theory is applied to the use of lead duplex wire. There is an air pocket between the two conductors. Condensation will occur in this space and when frozen will expand and split the lead sheath. This will then permit deterioration of the rubber and eventually breakdown of the circuit.

Therefore, if conduits are installed from 18 in. to 30 in. below grade, if lead covered single conductor wire is used, if one end or both ends of the conduit run are sealed to eliminate the circulation of moist air through the pipe, if all conduit joints are red-leaded and if conduit not smaller than $\frac{3}{4}$ in. size is used an almost permanent and lasting installation will result to assure continuous service with maintenance cost practically eliminated.

The suggested use of lead covered wire and conduit in the above method does not mean that other materials should not be used, such as parkway cable or trenchlay cable in tile, etc., but it has been the experience of the writer that this method provides a most economical way to secure permanency.

If contractors engaged in this class of work can look at these suggestions as opportunities to strengthen their own business they will be able to inspire the confidence of their customers. It is the obligation of each contractor to his field of endeavor to inspire in his customers a confidence that he knows and is practicing sound economies for the benefit of everyone.



how to figure adequate service capacity

as recommended in
ELECTRAGIST STANDARDS
for residence
wiring
adequacy

The required capacity of the service can best be determined by computing separately, (1) the capacity needed for the lighting and portable appliances, and (2) the capacity needed for the larger appliances. These two are then added together to obtain the total service capacity required.

I. LIGHTING AND PORTABLE APPLIANCES

Allow two watts per sq. ft. for the first 2,000 sq. ft. of floor area, plus one watt per sq. ft. for the floor area in excess of 2,000 sq. ft., plus 1,000 watts. The total is the required service capacity in watts for this part of the load.

EXAMPLE: The outside dimensions of a house are 30 ft. by 40 ft. exclusive of open porches. The house is two stories high, both stories having the same outside dimensions, and there are no finished rooms in the basement or attic.

Area of one floor.....	1,200 sq. ft.
Area of two floors.....	2,400 sq. ft.
2,000 sq. ft.—2 watts per sq. ft.	4,000 watts
400 sq. ft.—1 watt per sq. ft.	400 watts
Fixed balance	1,000 watts
	5,400 watts

2. LARGE APPLIANCES

Compute the total capacity of all large appliances to be supplied by the service. Add a reasonable allowance (not less than 1,500 watts) for future additions.

If in addition to a range and water heater, two or more other appliances are to be installed having an aggregate capacity of 3,000 watts or more, a demand factor of 70% may be applied to the total large appliance load, provided that the range capacity is not less than 7,500 watts. Where the above requirements are not fulfilled, the total capacity of the appliances at 100% demand factor should be used in computing the required service capacity.

Where both a range and water heater are installed, and the water heater is so controlled that it cannot be in operation while the full capacity of the range is being used, the heater may be neglected in computing service capacity.

EXAMPLE: Assume that appliances have been selected as listed below:

Range	8,000 Watts
Water heater	3,000 Watts
1 air heater.....	1,500 Watts
1 air heater.....	2,000 Watts
Oil burner	900 Watts
Spare circuit	1,500 Watts
	16,900 Watts

Automatic control restricting the water heater to night-time operation is not provided in this instance. The heater, not being limited to off-peak operation, must, therefore, be included in the connected wattage of large appliances. In this case the conditions are fulfilled which make it permissible to apply the demand factor of 70 per cent to the total large appliance load. Seventy per cent of 16,900 watts is 11,830 watts which is the required service capacity for this part of the load.

3. TOTAL SERVICE CAPACITY

Add together the wattages computed under (1) and (2). The sum is the required service capacity in watts. This should be divided by the service voltage, most commonly 230, to find the carrying capacity in amperes of the service conductors and equipment.

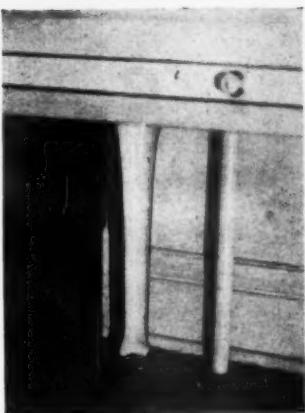
EXAMPLE: Using the wattages computed in the preceding examples:

Lighting and portable appliance..	5,400 Watts
Large appliances	11,830 Watts
	17,230 Watts

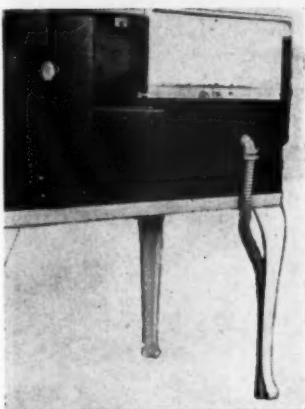
Dividing 17,230 by 230, the current is found to be 75 amp. For this current, the National Electrical Code, paragraph 612-a, requires No. 3 conductors. No. 3 is an odd size that is seldom used and therefore the next larger size, No. 2, should be used. A 100-amp. service switch should be installed and the rating of the service fuses may be equal to the carrying capacity of the wire, which is 90 amp., or if a service circuit breaker is used, in place of the switch and fuses, the breaker should be rated at 90 amp.

r a n g e c o n n e c t i o n m e t h

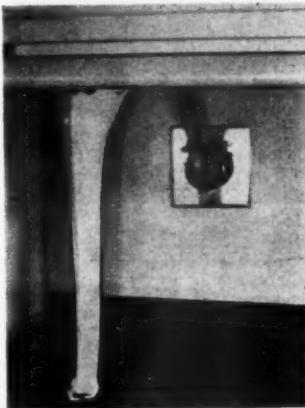
BY F. H. McCORMICK
ENGINEER, RANGE DIVISION
EDISON GENERAL ELECTRIC
APPLIANCE CO., CHICAGO



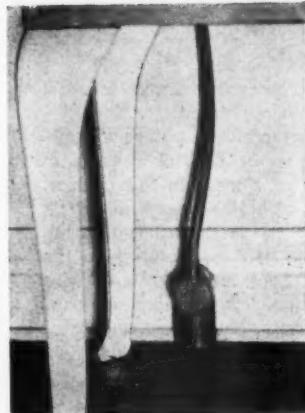
All materials and methods used in wiring in electric ranges in residences are fairly well standard and conform to current wiring practice with the exception of the connection between the branch circuit and the range terminal box. In view of the wide variety of wiring methods used at this point, this article is for the purpose of pointing out some of the essentials of a satisfactory connection.



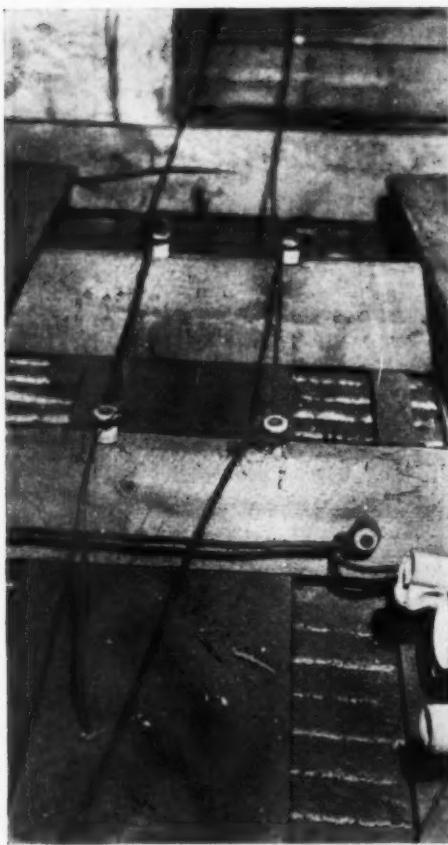
Probably the most common connection is made by running rigid conduit, or three wire armored cable, through a hole in the floor up into the range terminal box as illustrated in Figures 1 and 2. This arrangement requires that the range be in place before the electrical job can be completed or inspected. The range is permanently located making it difficult to clean or paint behind the range or lay new linoleum. If the user chooses to move, an electrician must make two calls. In new homes this arrangement is most objectionable as the size, exact location and type of range to be used is not known. In some few cases inspectors object to the use of armored cable through the floor without a pipe bushing and floor plate for mechanical support. A slightly lower cost job can also be done by using non-metallic sheathed cable in the same manner. This definitely requires bushing through the floor but, more important, does not provide an approved method for grounding the range frame.



A more modern connection uses a 40 amp, 3 wire flush receptacle and plate mounted in a standard 4-11/16 in. square box. The connection from the receptacle to the range is made with a three blade molded composition plug and armored cable. The ground connection is carried through the sheath to two grounding blades which engage with the grounded metal receptacle plate. This arrangement is particularly suitable for new construction where a flush job is desirable. The advantages of this arrangement are many. The job is complete when the residence is built, thus permitting a range to be installed at any time with a minimum of expense. The cable and plug may be installed on the range at the warehouse, or possibly by the range manufacturer. The plug-in arrangement enables the range to be moved when painting, moving, etc. Repossession on time payment sales may be made more readily. The appearance is reasonably satisfactory. In this connection, care must be used in so locating the receptacle as to not require the plug to be behind the range where it would be inaccessible and also prevent the range from being placed as close to the wall as it should. Neither is it advisable to locate the receptacle at one side of the range where the rather awkward appearing plug and cable are exposed. The ideal location is between the legs with the center about 12 in. from the floor. This type of receptacle with interchangeable plug connection is now available from several manufacturers. The chief objection to this arrangement is the higher cost of the fittings which is of minor importance in a new residence in view of the ease of installation and the many advantages obtained.



To provide for a satisfactory and inexpensive range receptacle which can be used particularly in wiring old homes, there has recently appeared on the market a base-board type of receptacle. The branch circuit is brought through the floor directly into the receptacle. This makes the installation very simple while the appearance in the kitchen is clean and not unattractive. The plug and cord connections used with this receptacle are of two types. The most commonly used, and lowest priced, connection uses a smooth three conductor rubber covered cable with the three contact blades moulded into soft rubber. This rubber covered cord and plug has the disadvantage in that it does not provide for a separate ground conductor to the range frame. The Code does not require that range frames be grounded (Rule 1606-a). However, practically all manufacturers definitely recommend that ranges be grounded. Assuming the rubber covered cord is used, the practice in many localities, with the approval of the inspection authorities, is to ground the range on the neutral or grounded wire of the circuit. This arrangement with the circuit grounded at the entrance switch insures a positive, fool-proof ground connection as applied to range installations. However, when it is desirable to have the ground connection carried through independent of the circuit wires an armored cable connection can also be used with the base-board receptacle by the addition of two grounding straps to the side of the receptacle. This arrangement occupies more space, is less attractive and more expensive than the rubber covered cord but complies with every requirement for a separate grounding conductor.



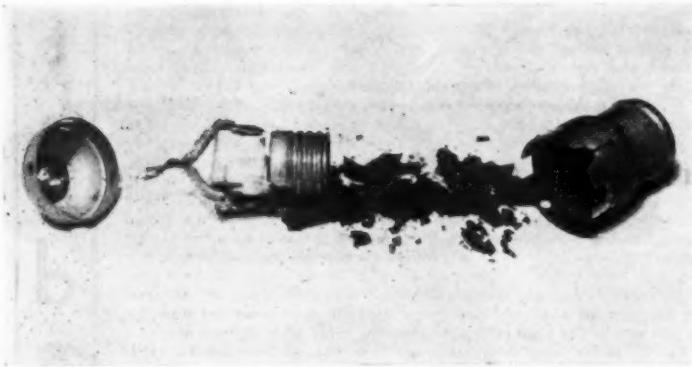
This picture was taken in the blind attic of a two family wooden house that was wired some thirty years ago (note old tie knots). It shows what rats and mice can do to unprotected wiring. One wire is shown absolutely bare for the distance of a foot or more. If this much can be found in the open, what condition can the system be under the floors and in the walls? Also note the piling of wall paper and bundle directly on the wires—not an uncommon practice.

w h y r e —

By HAROLD P. STRAND

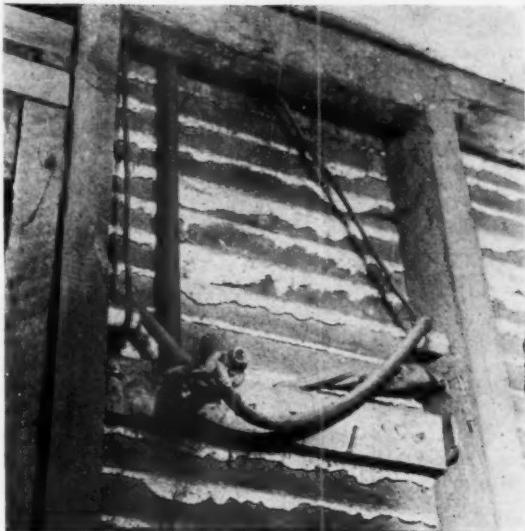


This bracket with its ornaments is located in the back hall of some large apartments. Upon closer inspection back of the canopy, it was found by the writer that no outlet box had ever been installed and the tape joints of circuit and fixture wires had evidently been made before the wall was plastered, and two humps in the plaster are the only indication that joints exist.

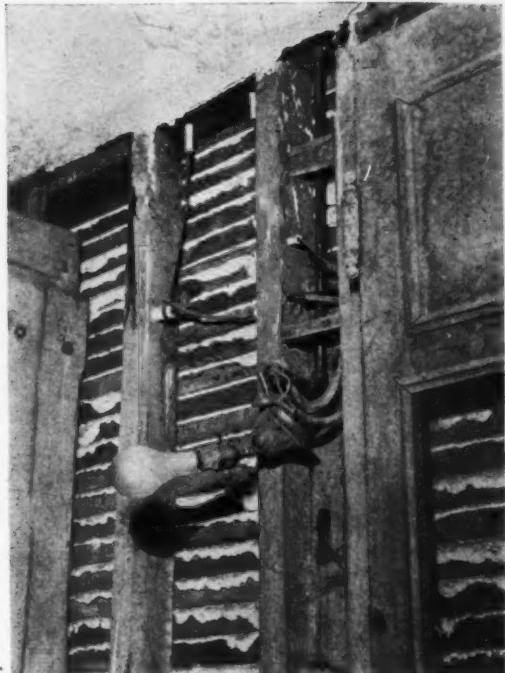


A keyless brass socket removed from one of the chain pendants in the window of an ice cream parlor and general store—one of several tenants in a brick block of stores. In this class of outlet, lamps of high wattage might be expected. A 200-watt lamp was in the socket and the heat has burned up the fibre lining and the cotton covered wire insulation as well. Note ends of copper strands—how they have shorted together and melted into little balls.

inspection



In the basement of a block of stores that were built and wired about thirty years ago, this case came to light. Once a combination wall outlet had been in use here, but from hard use or wear and tear the stem had been ripped out of the hickey and the wires broken off. Here it stands with live ends coming out the end of the hickey ready to shock someone or start a fire, particularly with such a lot of cobwebs and accumulation of dirt and dust. Also note wires coming down from above touching the old wooden cross piece with no protection of porcelain or loom. No outlet box is present.



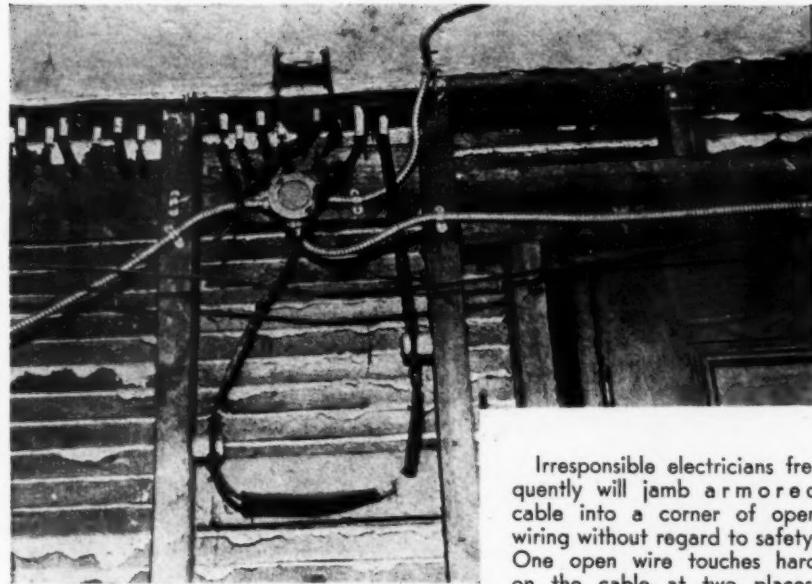
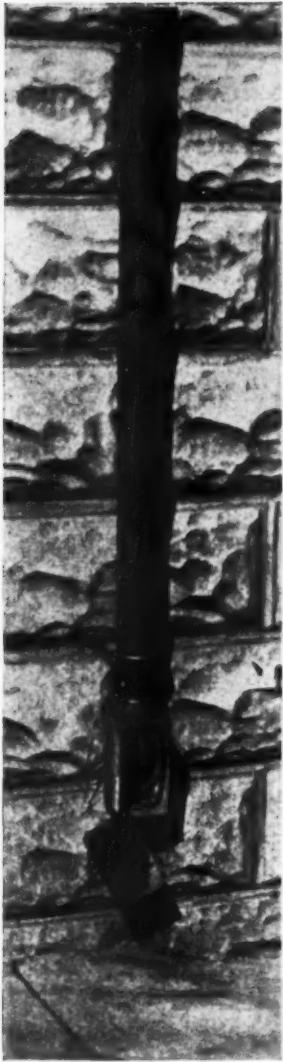
This bracket is in use in an unfinished room in a basement. It has fallen from the hickey but the wires are holding out so far. Note key broken off from socket, and also use of brass socket in damp location. One of the wires of No. 14 is touching hard against the gas pipe, where the loom is not long enough. Outlet box missing. Outlet in use by tenant.



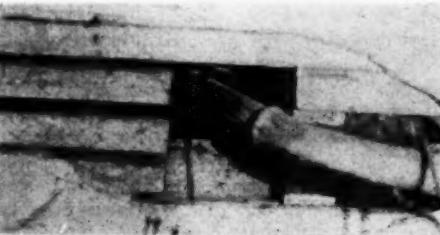
The fixture is of a convenient type—no box, just three screws into the laths. The cotton covered annunciator wires go under the canopy, with nothing but a thin layer of cotton to prevent a short. This job was unknown to the owner until the tenant moved out and when pointed out to him as dangerous, it was quickly removed. This is one of the cases where inadequate original wiring prompted this man to perform this amateur job.



In a single family house the tenant wanted a light in the pantry which was not provided by the owner. This room happened to be opposite the kitchen wall outlet. He removed this plug, fished a piece of armored cable up the wall and tapped the ends on in the switch box with no soldering or compound—just friction tape, and replaced the plate nicely as shown in this view.



ling in mid air. The wire going across the picture without support is a ground bond wire used to bond some armored cable out of view at the right and has absolutely no support from the clamp on the cable to the water pipe, a distance of 25 ft.



and more substantial construction. This case is that of a 2 in. service pipe on the side of a block of commercial buildings including stores and a garage. It has been in this condition for about three years with no attempt of the owner to make repairs.

A waste pipe was installed in this large building used for offices, stores and a banquet hall seating about 200 people. One of the open circuit wires was in the way, so the plumber just pushed it aside and his pipe is so tightly against it you can almost play a tune on the wire. It was not known by anyone else until some years later when some plaster fell down from the ceiling below due to the pipe leaking and the condition noted. It didn't happen to cause trouble but what a chance!



The main ground of a large brick church. The wiring was done many years ago, but the ground wire is run partly open as shown and without proper protection, in places. The principal trouble however lies in the attachment of the clamp to the pipe. The original bolt has rusted off and someone has taken some copper wire and attempted to tie the end of the clamp together by making a twist in the wire. The result is a ground probably of such high resistance as to be useless. The clamp fits loosely on the pipe and both are dirty and corroded.

job checking before /// final inspection

by

GEORGE WELMAN
ELECTRICAL ENGINEER

LOUISIANA RATING &
FIRE PREVENTION
BUREAU
NEW ORLEANS

As a rule contractors are familiar with the requirements covering the installation of interior electrical equipment. There are rules, however, that any person may overlook and technical defects listed by inspectors are annoying to any contractor. It is the technical requirements that make a standard and standards should be followed in the interest of safety and stabilization.

Inspectors feel that a full degree of cooperation necessarily means a final check of the installation by the contractor before applying for an inspection. Inspectors realize that their efficiency is due to long training and study of the rules. They also realize that contractors only learn the rules from incidental contact. The main problem with them is the cost sheet. Therefore we do not expect to see a perfect job in every instance. We do feel, however, that if a contractor would make a superficial survey of the completed installation that there would be fewer deficiencies reported. Inspectors try their best to overlook trivial omissions but they also feel that technical requirements in the interest of stabilization is the mainstay to safety, regardless of the discussion that a report may bring about. Many years of experience in dealing with contractors confirms our belief in impartial and honest inspection service.

Contractors will find that after a new installation has been completed a check of the work before notifying the inspection department to make an inspection will disclose many small items left undone.

Some features that should be checked by the contractor are:

1. Test insulation of the system.
2. Test load on each circuit and feeders.
3. See that grounding connection has been installed on both service conduit and service wire and that the conductors and grounding clamps are protected from mechanical injury, also that all connections are tight, especially the clamps.
4. See that all fixtures are properly supported.
5. See that all outlet boxes have covers or canopies.
6. Look for unused holes in cabinets and boxes that have not been plugged.
7. See that trims around meters have been installed, also all cabinet trims.
8. See that plaster or surface around outlets has been repaired.
9. See that all lock nuts and cable couplings are tight.
10. See that no conduit bushings have been omitted.
11. See that all conduit couplings are screwed up tight and that conduit has been properly supported.
12. Look for oversize fuses.
13. See that all boxes are flush with finished surface or on plastered walls do not lack more than $\frac{1}{4}$ " of being flush.
14. See that switches and fuses do not overheat when full load is connected.
15. See that joints are properly soldered and taped.
16. See that lugs are used on wires larger than No. 8 gauge or on fittings that are not provided with upturned lugs.
17. See that the white or gray wires (grounded wires) are connected to proper terminals of all fittings.
18. See that no crossing tubes or porcelain bushings are missing or slipped out of place and that wires are free from contact with all objects except their supports.
19. See that outlet wires are properly bushed.
20. See that concealed wires are 5 in. apart and that wires are supported not more than $4\frac{1}{2}$ ft. between supports.
21. See that unused outlet wires are taped and placed in boxes with covers on boxes.
22. See that outlet boxes and fixtures are insulated from or grounded when installed on metal surfaces or metal lathed buildings.
23. See that all conduit fittings are of the approved type.
24. See that all conduit has been reamed.
25. See that wires of different systems are not in the same conduit or cabinet.
26. See that lead sheathed cable is used under ground floor slabs.
27. See that conduit sizes are not too small for the number and size of wires used.
28. See that metal or wooden raceways are not used in damp places or on damp brick walls.
29. See that proper bushings are used at the ends of all metal raceways.

30. See that lead sheathed armored cable is used in damp places.
31. See that armored cable is protected from mechanical injury.
32. See that non-metallic sheathed cable terminates in boxes or cabinets and is not subject to mechanical injury or moisture, also that it is secured by straps and not nails.
33. See that the fittings used in gasoline pumps are of the explosion proof type.
34. See that all switch and receptacle plates have been installed.
35. See that outdoor cabinets are of the weatherproof type.
36. See that not more than four circuits enter an un-guttered cabinet or that the conduits enter opposite the terminals of the fittings.
37. See that only approved floor outlet boxes are used in floors.
38. See that no concealed or inaccessible junction boxes have been installed.
39. When open wires leave a cabinet see that each wire is separately bushed.
40. See that no fuses or single pole switches are installed in the grounded side of the circuit.
41. See that fuses have been installed at a change in the size of wire or that smaller wires be otherwise protected as required by the code.
42. See that cabinets and boxes are flush with finished surface and in the case of plastered surfaces do not lack more than $\frac{1}{4}$ " of being flush. In combustible walls this rule does not apply.
43. See that not more than 12 outlets have been installed on a circuit in areas exceeding 1,200 square feet.
44. See that motor protective devices are set to open the circuit on not more than 25% overload according to the motor name plate rating.
45. See that all motor frames on potentials exceeding 150 volts to ground are grounded.
46. See that no grounding conductor smaller than No. 8 gauge is used.
47. See that all cutouts are in cabinets and that all switches are also enclosed when the latter are used in circuits exceeding 150 volts to ground.
48. See that single throw switches do not close by gravity and that double throw switches are mounted horizontally or are provided with a locking device to prevent the switch from closing by gravity.
49. See that blades are dead on knife switches when switch is in open position.
50. See that sub-bases are used on snap switches used with open wiring.
51. See that all time switches or sign flashers are in cabinets.
52. See that there is a clear space of at least 18 inches between all wiring and apparatus and the wall back of the board.
53. See that instruments, pilot lamps and potential transformers on switchboards are protected by fuses.
54. See that fixture wires are not in contact with sharp edges of fixture metal.
55. See that fixtures used in show windows are of a type listed for show window work.
56. See that no screw shell receptacles are installed for use with attachment plugs.
57. See that the male end of a cord connection or any other attachment device is always the dead end.
58. See that portables are provided with guard and handles.
59. See that all flat irons used in other than residence occupancies are provided with approved signal lamp or are of the automatic type.
60. See that resistances have been mounted 1 foot from woodwork or that a $\frac{1}{2}$ " separation of slate, marble or asbestos board is provided.
61. See that storage battery room is well ventilated.
62. See that only rigid conduit is used in elevator hoistways.
63. See that elevator limit switches in garages are at least 4 feet above floor.
64. In hazardous locations especial care should be taken to check each rule with the equipment installed.
65. Theatres, signs and high voltage equipment needs careful checking, which is generally the case and special items to check by the contractor are not considered necessary to list.

by A. J.

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c i r c u i t ?

The object of obtaining the average length of branch circuit conduit per lighting outlet, may be for any one of three purposes: (1) as a basis for labor unit per foot of conduit, (2) as a check against the measured takeoff, (3) for an approximation when no lighting layout is given.

The best method for determining this distance is by referring to an accurately measured takeoff of the same type of building wherein the variables are similar to those of the job in question. These variables consist of the floor area and heights, number of outlets, additional ties between outlets (usually empty conduits), the heights of outlets, the circuit grouping for home runs, and the locations of the lighting panels.

The accompanying table shows the wide variations in the measured average length of branch circuit conduit per lighting outlet in buildings of the same general type.

**LENGTH OF BRANCH CIRCUIT
PER LIGHTING OUTLET**

TYPE OF BUILDING	AVERAGE DISTANCE	VARIATION	BUILDINGS FIGURED
APARTMENT	13.6	11.7 — 18.2	82
BANK	18.1	13.0 — 21.8	13
CHURCH	25.6	18.5 — 31.8	6
CLUB	15.7	14.0 — 17.3	3
COURTHOUSE	18.0	14.5 — 21.3	5
DEPARTMENT STORE	28.7	21.1 — 39.6	4
DORMITORY	15.7	14.6 — 17.1	3
FACTORY	20.7	12.5 — 32.4	13
GARAGE	26.2	19.0 — 32.5	5
GYMNASIUM	21.5	19.0 — 23.4	2
HOSPITAL	17.4	12.3 — 20.4	22
HOTEL	16.3	12.0 — 21.0	14
LABORATORY	15.1	14.3 — 16.4	3
LIBRARY	12.4	9.7 — 16.5	3
LOFT	24.8	15.4 — 32.7	10
MUSEUM	33.1	30.3 — 36.0	2
NURSES' HOME	15.7	14.9 — 16.3	5
OFFICE	17.8	12.1 — 26.2	51
PIER	22.5	22.0 — 23.0	2
PRISON	15.6	11.6 — 21.0	4
POST OFFICE	17.7	15.2 — 20.1	4
RESIDENCE	16.3	14.7 — 20.1	6
SCHOOL	20.3	14.2 — 26.0	30
STORE	18.4	15.6 — 22.6	5
TELEPHONE	26.2	19.7 — 35.0	10
THEATRE	21.6	16.0 — 22.6	6
WAREHOUSE	22.3	12.5 — 30.5	14
Y M C A	17.1	14.9 — 19.5	3

It can be readily seen from this table that care should be exercised, when using the reference method, that the reference job is similar in every respect to the job in question.

The next best method is a combination of measured home runs and calculated outlet wiring. The total area is divided by the total number of ceiling and bracket boxes, and the square root of this quotient is the average horizontal distance for these outlets. The average horizontal distance for switch boxes is assumed to be $\frac{7}{10}$ of this distance. The average horizontal distance for receptacle and floor boxes is obtained by dividing the total area by the total number of these boxes and finding the square root of the quotient. The total horizontal outlet conduit is obtained by multiplying the ceiling and bracket boxes and conduit ties less the home run conduits, the switch boxes, the receptacle and floor boxes, by their respective average horizontal distance. When the conduit drops from the floor slab to a furred ceiling box, add double the amount of each drop (an average of 3 ft. total each) for every ceiling box and conduit tie. Also add the switch and bracket drops (an average of 7 ft. total each), and the receptacle drops (an average of 3 ft. total each). The sum of the horizontal outlet conduit, the outlet drops, and the home run conduit, should equal the total conduit.

Though the best method of determining the home run conduit is by accurate measurement, the average length may be closely approximated by the "long diagonal" method, which consists of scaling the distance from the lighting panel to the farthest point of the area it serves excluding passageways. When there are several panels the average long diagonal (mean diagonal) should be obtained. In buildings where the circuits are well grouped and the lighting panel serves a large area, such as in office and factory buildings, the aver-

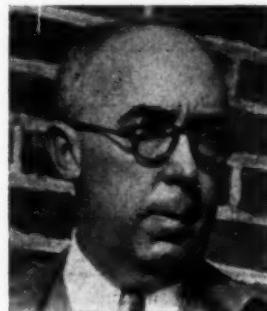
age length of home run conduit is assumed to be one-half of the mean diagonal plus the conduit drop (an average of 5 ft.). When the task of determining the number of the home run conduits is too tedious or when no conduit layout is given, assume the number of home run conduits to be one-half the number of panel board circuits. In buildings where the circuits are not well grouped and each lighting panel serves a small area, such as in apartment buildings, the average length of home run is assumed to be one-fourth of the mean diagonal plus an average drop of 5 ft., and the number of home run conduits is assumed to be four-fifths of the number of panel board circuits.

The third method of obtaining the average length of branch circuit conduit per lighting outlet is entirely by calculation. The outlet conduit is determined in the same manner as in the second method. The mean diagonal is found by multiplying the square root of the quotient of the area divided by the number of lighting panels, by five-fourths. This method is not as accurate as the second method and should be used only when no lighting layout is prepared.

To determine the size of conduit and the quantity of wire from these calculations: assume the outlet conduit (less empty conduit) to contain $2\frac{1}{2}$ wires; assume the calculated home run conduit with well grouped circuits to contain 2 circuits; assume one-fourth of the calculated home run conduit with poorly grouped circuits to contain 2 circuits, and three-fourths to contain 1 circuit.

A ganged outlet should be treated as a single box (a switch-receptacle combination as a switch box) but an allowance should be made in the wiring for any increase in conduit size caused by each device. When three or more circuits may be grouped efficiently in a single home run conduit, or the floor heights are greater than 11 ft., or there are few floor and receptacle boxes, or the receptacle boxes are placed unusually high, the suggested assumptions and averages should be modified to conform with the actual conditions.

profitable industrial specialization



J. O. CASE
PRESIDENT
QUALITY
ELECTRIC CO.

Primarily contractors in the field of industrial power, the Quality Electric Co., Ltd., of Los Angeles, over the 35 years that it has been rendering service in Southern California, has been built up into an organization that in a way is similar to a university, composed of a number of colleges each specializing in its particular field. There are six major lines in which this specialization is directed, in so far as the contracting end of the business is concerned. Aside from these, there are a number of other activities that are carried on with profit.

MAJOR FIELDS OF SPECIALIZATION

INDUSTRIAL POWER INSTALLATIONS:—Engineering knowledge saves plant operators needless expense in electrical installations. Intelligent planning, and redesign of plant equipment for increased efficiency and safety.

DAY AND NIGHT REPAIR SERVICE:—Twenty-four hour service is maintained. Immediate relief of costly shutdowns. Motors in all sizes rented.

INDUSTRIAL HEATING:—Engineers employed capable of working out for the manufacturer the various problems

where electrical heat can be employed in the manufacturing processes.

ELECTRICAL ENGINEERING AND CONTRACTING:—Every engineering and mechanical facility to enable them to render to industrial plant owners and operators a complete, intelligent and satisfactory electrical service.

ELECTRICAL REPAIRS:—Maintain a modern repair shop where all types of electrical equipment are repaired and rebuilt, employing standard factory methods and materials.

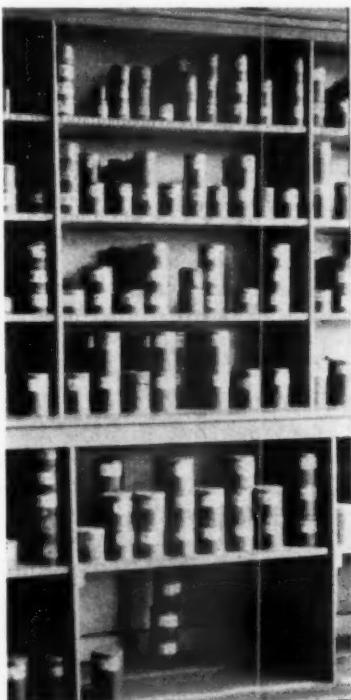
INDUSTRIAL LIGHTING:—Engineering department which employs electrical and illuminating engineers capable of handling the complete lighting problem of any industrial plant, no matter how large or how specialized its requirements.

The foregoing is no more than an enumeration of this company's major activities. Detailed description of the internal organization back of these six departments would not be as profitable to the average contractor as descriptions of individual plans that are being worked out to bring in profitable business.

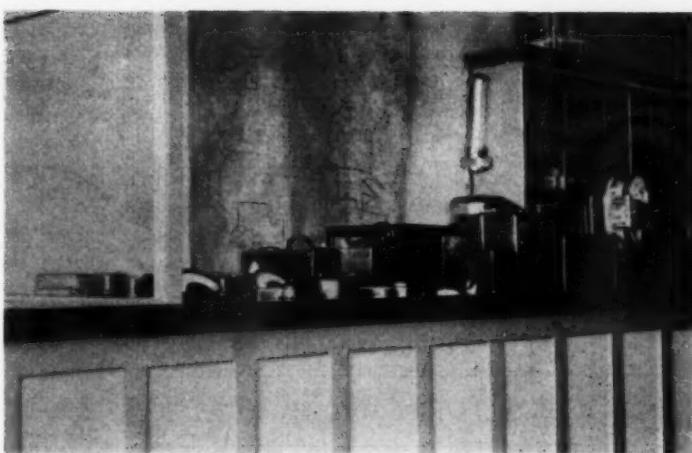
Electrical Contracting, August, 1932

INSTRUMENT REPAIR LABORATORY—Seeing profit in the repair of electrical measuring instruments, and sensing a field that is not overcrowded, the president of this company, J. O. Case, established the laboratory as an adjunct to their general repair specialization activities. He secured a very high grade technician, who, with one assistant, does all this work in a department ranged along one side of the general offices and requiring a space scarcely 20 ft. long by 6 ft. deep. The craft of these men is about as delicate as that of the watch-maker. This department was put in during May of 1931 and has been successful from the start. It is now the authorized repair service for the Weston Electrical Instrument Co., and in the radio line for Sylvania, Dayrad and Cunningham. It should be understood that no ordinary radio repair work is done here. Only that connected with tube testers and the like used by radio wholesalers and dealers. Some of the more elaborate of these instruments are valued at more than a thousand dollars. The percentage of profit in this department is the best of any in the business. Considerable equipment is required and highly specialized technicians. Therefore, there is comparatively little competition and a greater mark up is possible. And yet, it is cheaper for these manufacturers than maintaining their own service departments.

TAKES ON ELECTRICALLY OPERATED TOOLS—With the fact uppermost in his mind that the electrical work in connection with motor repairs is on the wane, owing to the constant improvements in connection with this class of machinery which protect it more and more under operating conditions, Mr. Case is always alert for the unusual things to do; that is, from the contractor standpoint. Last October he took on the complete service work for Black & Decker and Van Dorn electrically operated tools in this territory. Formerly they maintained their own repair departments. Now Quality Electric Co. is the repair department for both. As a matter of fact, this enabled the manufacturers to close their headquarters here altogether.



Portion of Display of Small Paper Pulleys



Instrument Testing Laboratory

BECOMES PULLEY DISTRIBUTOR—Quality Electric Co. is exclusive factory distributor of Rockwood pulleys in the Southern California territory. This authorizes them to sell at retail, to stocking dealers and to industrial distributors. They carry in stock five to six thousand pulleys, ranging in size from the smallest up to 24 in. This stock will inventory nearly \$12,000.

RE-WINDING POWER TRANSFORMERS—Stepping out of the roll of the ordinary motor specialist, Mr. Case stepped around to the electric utilities in Los Angeles and proved to them that his company could do practically all the transformer re-wiring work that they might have except for some of the very largest. As a consequence they are now doing this work for the utilities on a profitable basis and saving the utilities money. Some of this work is routine and some of it emergency and very much rush. But it all goes through just the same. Most of it is handled on a time and material basis.

DOCTORING SICK POWER BILLS—Saving the industrial plant operator money on his power bills is one of the things that the Quality Electric is an adept at. It is a kind of specialization work that is going on all the time at every place where a saving can be made. As an example, a large industrial plant was shown here, by cutting out a number of 2-phase motors, and substituting synchronous motors, a saving of over \$250 could be made every month in the power bill. While this change was made coincident with some general overhauling work and the installation of a new switchboard, and so the actual cost of the motor replacement was not segregated, it was estimated that the motors and the installation would just about pay for themselves in three years time through reduced power bills.

SELLS MAXIMUM DEMAND ALARMS—There is a well-known electrical instrument that automatically sounds an alarm when the load on a circuit approaches that of maximum demand. Everybody knows that when the load tops that rise a stiff rate penalty is applied. In Los Angeles it means a penalty of a dollar a month per K.W. to go over that maximum demand. So Quality Electric recently sent out 75 letters to a selected list of industrials and got back 25 replies right off the bat, some of which are just beginning to materialize in business secured.

electrical contracting

With which is incorporated The Electragist

S. B. WILLIAMS, Editor

WORKING OVER OLD DIGGINGS

OUT west the unemployed are digging over the old-placer gold fields and finding gold. The amount is small but it is something.

This is typical of what is going on in every line of business today and electrical construction is no exception. One of our subscribers made a significant statement in a letter to us this week. He said that when business was good he did not have time to develop small business from former customers. Now, however, he is going back to everyone he ever did any work for and like the new gold miners, he is finding business by "working over the old diggings."

There are still some contractors who are filling in their idle moments at the pool-room, but they do not count because they will not be with us for long.

There are ways of getting wiring business but it takes a lot of hard work to find them. But then this is a battle for the survival of the fittest. Those with the will to win will win, while those that are afraid to make the effort, will just naturally fall by the way-side.

OUT OF TOWN

WITHIN the past week we have had two letters from contractors who were contemplating trying for some out-of-town work, that indicated how dangerous it is to get away from familiar working conditions.

It is a great temptation when work is slack to put in a bid on work elsewhere, particularly if one knows the architect or the general contractor or some influential local friend. Nevertheless, the local conditions re-

garding ordinances, special rules, utility rules, labor, working conditions and efficiency, climatic conditions, etc., can easily put any job into red ink if not known and figured on originally. Moreover, local contractors are not going to help matters any unless one of them has a stake in the job—and that costs something.

All in all, unless you know all of the tricks and all of the local conditions it might be just as wise and a lot more profitable to stay at home.

CHEAP FUSES

FUSES are being offered for sale that are very cheap but stand upwards of 350 per cent overload before blowing. Tests made of such fuses in New Orleans showed a 15-amp. fuse holding 15 amps. for 4 minutes, then the load was increased by steps of 5 amps. each 4 minutes until 35 amps. were reached when it blew after 2 minutes. The fuse was in circuit in all 18 minutes. A 10 amp. fuse went through the same performance finally blowing at 35 amps.

This is another reason why sales control ordinances are so necessary.

THE RIGHT TO WIRE

EVERY now and then a new ordinance states that an individual may do wiring in his own home under certain conditions. This is good law.

Every citizen has the right to do as he pleases in his own home provided he does not disturb the peace of his neighbors or set up a condition that might endanger property of others. In the case of wiring, therefore, a citizen may do his own work provided he takes out a permit and has an inspection. On the other hand, work done by other than licensed contractors must be extra carefully inspected because of the possibility that it might be wrongly installed everywhere. Where on work done by contractors the inspector might pass up some trivial violation, knowing that the job as a whole was well installed, it would be contrary to public safety for an inspector to pass up even the smallest fault in wiring installed by other than a licensed contractor.

In other words, let the individual do his own wiring if he wants to but make him conform to very strict regulations—who knows, perhaps he won't want to do it after all.

NEW WIRING METHODS

WHAT should be the point of view of the electrical contractor with respect to the introduction of new types and systems of wiring? Some sane thinking is necessary if we are to escape an acrimonious discussion every time a new method is announced.

In the first place we cannot stand still. Development of new products and systems is inevitable.

In the second place, the price at which the product is to be sold, or the cost to install, should not be an influencing factor. Economic history shows that if a product is good it will have a market and public acceptance. Bucking the introduction of a good product merely because of its low price might easily result, as it has in other industries in the past, in the by-passing of the opposing element.

In the third place, it is of little consequence that a new method adds a new stock of materials. If it is good enough to make a place for itself in the market it will find its own level in competition with other products. If there is a less desirable product or method, the normal economic laws will bring about its elimination in an orderly and normal manner. If the new product does not measure up, it will fail to secure a foot-hold and will eliminate itself.

There is only one tenable point of view for the contractor with respect to new wiring methods. Are they safe?

On the other hand, contractors should take a very definite stand against any propaganda that present day wiring is too costly and that less expensive methods should therefore be developed. Such propaganda is not based on fact but merely upon the supposition that anything costing less will have a greater sale. It represents a thinking that refuses to recognize the constant development and improvement of product by our present manufacturers or the constant effort on the part of contractors to reduce cost.

The objection to that kind of propaganda is that it focuses attention upon cheapness instead of the job to be done. It is our opinion that new and better wiring systems will come as a natural development. It is also our opinion that any attempt to force the issue will fail because it will result in the introduction of products or methods in an unnatural manner.

Such a situation is with us today. The Association of Edison Illuminating Com-

panies has, for years, favored the introduction of cheap European wiring methods. They have underwritten the manufacturing development costs of a type of concentric wire and are about to have two hundred test installations made in each of five large cities.

Instead of using the natural distribution channels, the goods are shipped direct from manufacturer to utility which supplies them, at least so far as the jobs to date are concerned, to a firm that had not previously had a contractor's license.

Every cost in such jobs is bound to be wrong, but that is the natural result of forcing. Afraid to face the truth the backers of cheap wiring resort to cost manipulation.

Electrical contractors must remember that after all they are the point of sales contact with the customer. The more expensive wiring systems, if right, must have many advantages over the less expensive systems and as such can be sold. If they have no advantages then they have no right to survive.

HOW TO SELL REINSPECTION

MOST human beings are reasonable but they like to be shown. They would a whole lot rather be sold a gold brick than have a fortune rammed down their throats.

This is something for the electrical contractor to consider when he attempts to introduce reinspection into the local ordinances.

Reinspection can be sold to the public. The inspection department is interested in reinspection and as a rule can be counted on to back it. The city council, however, is always suspicious of anything brought to it by a group. What is the selfish interest? they ask themselves.

The council, however, can be educated, at the same time the public is being educated, in such a fashion as to make that body adopt the idea as its own.

Get your facts together regarding reinspection. Take some photographs of horrible examples. Then have the inspection department talk to the newspapers. Have something of interest for the reporters regularly. Write letters to prospects urging them for safety reasons to have their wiring reinspected. Have the local chief inspector broadcast the danger of letting wiring go too long without a reinspection.

Do all these things and do them regularly and it will not be long before the public will be clamoring for reinspection.

\\ \\ code chats // /

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS
OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING
A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE.

CONDUCTED BY F. N. M. SQUIRES
ASSISTANT CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

No. 14 WIRE AS A FEEDER

In your June Code Chats, I notice an article headed, "No. 14 Wire As a Feeder," which I beg to differ with you in your answer and offer the following as my reason in doing so.

Since Rule 613 a-5 includes service conductors which are referred to in said rule as feeders, rule 404 par. b would automatically come under the same classification and therefore rule 404 par. b would have to be satisfied before rule 613 could be used as a basis for interpretation of the code on feeders.

While rule 613-a (5) classifies the service conductors as a feeder it should not be interpreted as classifying all feeders as service conductors. The intent of 613-a (5) is to mean that the size of the service conductors as well as the other conductors mentioned is to be determined by section 613. Of course, section 613 does not supersede section 404-b to allow service conductors to be smaller than the No. 8 or No. 12 mentioned in 404-b. But there is no intent to imply that all feeders are to be at least of No. 8 wire (or at least No. 12 in a one circuit job).

If, in the 650 sq. ft. building mentioned in our June Code Chat but one circuit was used, the service conductors could be No. 12 and the feed from the service to the branch circuit cutout could be No. 14. Of course, it is probable that the branch circuit cutout would be right at the service but it would not necessarily have to be.

Had more than one branch circuit been employed, then the service conductors would have to be not smaller than No. 8 even though the load remained the same but still No. 14 feed from service to the branch circuit cutouts could be used. Of course, as

soon as the load would exceed 15 amp. than a larger capacity feed would have to be used.

walls of a frame house from the attic to the basement where the distributing panel is located?

The 1930 Code in section 404-a was quite specific in prohibiting the running of service wires within (not through) a wall, unless certain conditions were met, one of which was that the conductors be protected by fuses at the outer end. The 1931 Code has made this a recommendation rather than a rule thus leaving it up to the local inspection department to decide whether or not this construction would be allowed.

In the case in question there are fuses at the outer end of the service, but they do not protect the service wires because they are of 100 amp. capacity instead of being of 70 amp. capacity as is required by Rule 612-a for the proper protection of No. 4 wire. In other words if the fuses on the pole are of 70 amp. then the "service" wires could be run down inside the frame wall of the building.

SWITCHES FOR APPLIANCES

We are figuring on installing electrical appliances in a restaurant in this city. Would it be all right to have one distribution panel for the different appliances with the disconnecting switches and the fuses in the same panel box, this panel to have a wiring gutter also a door which is kept closed, or should there be a disconnecting switch for each appliance outside of the distributing panel?

Rule 1603 requires that for appliances of over 1650 watts capacity each appliance shall have a switch which shall be readily accessible to the operator of the appliance but that a receptacle and attachment plug of proper capacity may be used in lieu of the switch.

Where appliances of less than 660 watts each are grouped on one cir-



"CONTRACTED" TOGETHER FOR 30 YEARS.—Mr. and Mrs. H. W. Lewis have held forth in the same location in Fresno, Cal., since 1908. Mrs. Lewis running the store and Mr. Lewis, who is known to everybody around there as "Pop," doing the estimating and running the wiring crews. That makes 23 years, but they started in the electrical contracting business in San Francisco in 1903, which figures up almost 30 years anyway. Mr. Lewis wired the Monadnock Building in San Francisco before and after the fire. They had no store then but Mrs. Lewis always helped him in many ways with his estimating and other work. The toy poodles are being held up for the sake of "local color."

G-E WHITE

MADE BY
GENERAL ELECTRIC



FLEXIBLE
ALLOY STEEL

HOT-DIPPED
GALVANIZED

GLYPTAL
COATED

for easy bending and
economical installation.

for permanence and maximum protection inside and out.

for extra long life and easy wire pulling.

For further information see your nearest G-E Merchandise Distributor or write to Section C-328, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

Tune in! Join the "G-E Circle" every weekday noon, (except Saturday) D.S.T., N.B.C. Network.

GENERAL  **ELECTRIC**
RIGID CONDUIT

MERCHANDISE DEPARTMENT. GENERAL ELECTRIC COMPANY. BRIDGEPORT. CONNECTICUT



THE SANGAMO ELECTRIC COMPANY

Established in 1899, the Sangamo Electric Company is today one of the leading manufacturers of electric meters. In 1924, Sangamo engineers designed an electrically-operated clock. Thousands of Sangamo clocks are now providing accurate time in homes and offices throughout the country. This is the background of experience which Sangamo brings to the manufacture of its time-switches . . . the Form VW, the Form VS and the Type T.

The **SANGAMO** FORM VW

The Lowest-Priced Electrically-Wound Time-Switch

The outstanding features of the Form VW Time-Switch are:

ELECTRIC-WINDING . . . by a powerful, low-speed a.c. motor. During any current interruptions, the main-spring, having a 10-hour reserve, provides power for movement and contacts. Independent of frequency and voltage variations.

DEPENDABLE TIMING . . . assured by a jeweled balance, with a hairspring of special non-rusting, temperature-compensating alloy.

REVOLUTIONARY MECHANICAL CONTACT . . . slow-opening, small-gap. Recently introduced, but thoroughly tested in actual service before being incorporated.

FREQUENCY OF OPERATIONS . . . 3 "on" and "off" periods each day. Sunday and holiday cut-out. Manual operation without disturbing the sequence.

DUST-PROOF CASE . . . made of pressed steel, with pry-outs bottom and back.

FULLY GUARANTEED . . . by Sangamo Electric Company . . . with sales, service and engineering facilities adequate to care for any requirement. Write for literature.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

**The
SANGAMO
FORM VS**

**The New Low-Priced
Synchronous Motor
Time-Switch**

**The outstanding features of
the Form VS Time-Switch are:**

SYNCHRONOUS MOTOR. A slow-speed, high-torque, self-starting motor... powerful, sturdy, dependable... assures accurate operation on controlled-frequency circuits. Built for 25-, 50- and 60-cycle... speed 240 rpm (at 60-cycles).

DEPENDABLE TIME. The VS incorporates all the proven mechanical superiorities of the VW. The Sangamo synchronous motor insures unvarying accuracy on regulated circuits.

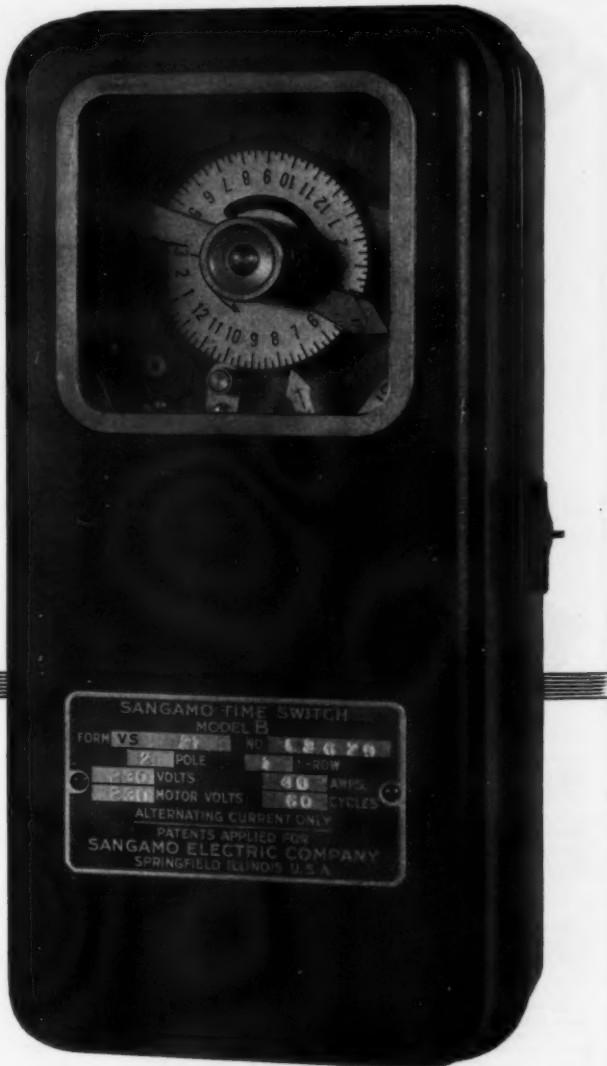
MECHANICAL CONTACT . . . The contact in the VS is of the same slow-acting type as that used in the VW. Thoroughly tested before being incorporated in the VW and still further proved in that switch.

FREQUENCY OF OPERATIONS . . . 3 "on" and 3 "off" periods, each 24 hours.

DUST-PROOF CASE . . . made of pressed steel, with pry-outs bottom and back.

INTERCHANGEABILITY OF PARTS . . . The case, contacts, dial and operating levers are interchangeable with the VW.

GUARANTEE . . . by Sangamo Electric Company... with sales, service and engineering facilities adequate to care for any requirement. Write for literature.



THE SANGAMO TYPE T TIME-SWITCH



In switch-control applications where the service is uncommonly severe... in instances where a great many "on" and "off" operations are needed... in cases where only the very finest switch is good enough... the Sangamo Type T is recommended. It has mercury-tube contacts, is independent of frequency and voltage variations, is available for a.c. or d.c. operation. Conduit-connected base, or meter-terminal base.

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS

TESTED SUPERIORITY

Ideal Solderless—tapeless Wire Connectors are better! Actual field and laboratory tests have proved their superiority over solder and tape joints in these four ways:

- 1—Make joining of wires quicker and easier.
- 2—Electrical resistance is less.
- 3—Joint is 3 times stronger.
- 4—Insulation is perfect and is unaffected by heat, moisture or acids.

Honest tests have proven these four important points. Millions of IDEAL Connectors have been used. What better proof attests their merit? But let them prove themselves to you—send coupon for free samples.

IDEAL
WIRE
CONNECTORS

Ideal Commutator Dresser Co.
1041 Park Ave., Sycamore, Illinois

FREE SAMPLE 8-32
IDEAL COMMUTATOR DRESSER CO.,
1041 Park Ave.
Sycamore, Ill.

I would like to try Ideal Connectors and ask that you send free samples.

Name _____
Firm Name _____
Address _____
City _____

U. S. Patent No. 1,700,085. Infringements will be vigorously prosecuted.

APPROVED BY UNDERWRITERS



HEAD OHIO AND PENNSYLVANIA CONTRACTORS: P. M. Geary is manager of the Electrical Contractors' Association of the Lake Erie District. This organization is the result of a merger of the Associations in the cities of Erie, Pennsylvania and Youngstown, Ohio, which occurred in August, 1931. Since then Geary has spent half of every week in each city, and the arrangement has enabled the two groups to carry on more efficiently.

cuit the circuit switch will serve as a disconnecting means and the attachment plug at the individual appliance will serve as a switch at the appliance.

In the installation referred to above each appliance is probably connected to the circuit by an attachment plug. It would therefore be permissible to have the circuit switches in the panel box, the door of which is normally kept closed and no additional switches outside of the panel would be required as the attachment plug takes care of that.

BELL TRANSFORMERS

What are the Code requirements regarding bell transformers? Must they have a separate circuit? Must they be placed in a metal box or cabinet?

A bell ringing transformer is a fixed appliance just as much as several other common devices and therefore comes under the requirements of Article 16. Here we find that appliances of not over 660 watts may be placed on an ordinary branch circuit. As these transformers are generally rated at 25 watts they meet this condition and therefore a separate circuit is not required.

With some contractors it has been the practice to insert a 3-amp. fuse just ahead of a bell ringing transformer and this is not to be dis-

couraged, although unnecessary, as it localizes trouble and prevents an outage on the whole circuit when the transformer burns out—and the windings do burn out now and then.

Most of these transformers are enclosed in a metal shell or casing which protects the windings from mechanical injury and prevents fire or sparks escaping from the windings. Such metal clad transformers need not be further enclosed in metal boxes or cabinets although a much neater job results from doing so.

One type of these transformers comes mounted on the cover of a 3 in. round box, so arranged that pigtails are left for connection to the circuit wires within the outlet box and with binding screws to attach to the bell wiring on the outside. Another type comes ready to be mounted within the ordinary wall case or gem X box.

SEPARATE CIRCUIT FOR REFRIGERATORS

Does the Code require that an electric refrigerator be connected on a separate circuit?

The common household type of electric refrigerator usually has a motor of about $\frac{1}{4}$ hp. Rule 1602-a (1) and (2) sets forth that "one or more fixed or portable electric appliance, each rated at 6 amp. or 660 watts or less may be used on lighting branch circuits or on combination lighting and appliance branch circuits" and that "one or more fixed or portable electric appliances each rated at not over 1320 watts may be supplied by an ordinary appliance branch circuit." Thus the grouping of the motors is established but not as to how many.

The fine print notes under the caption of 1602 explains that the protection for such circuits is not to exceed 15 amp. and this is governed by rule 807-d. This is again covered in rule 808-c, exception 2. From these rules we find that small motors, such as are used to operate electric refrigerators may be grouped on a branch circuit with or without a lighting load, provided each motor does not require over 6 amp. where used with other lighting load or 1320 watts without lighting load and provided that 15 amp. fuses may be continuously maintained in the circuit. Thus a separate circuit is not generally required for each refrigerator.



FLAME RESISTING CODE WIRE

General Electric Code Wires can now be obtained with a flame-resisting finish in Code, Intermediate and 30% grades. This new finish not only provides the required protection against moisture but also eliminates fire hazard.

G-E flame-resisting code wire has all the desirable features which have always characterized G-E Code Wires. Insulation is as "free-stripping" as the underwriters specifications permit. Colored Rubber Insulations (Black-Red-Green) identify the grades, Code-Intermediate-30%. Eight colors of braids simplify circuit testing and save time on extension and alteration work. Braids are tight and close — will not fray or slip back. Smooth, hard surface makes wires easy to pull and does not become "sticky" or "tacky" in warm weather. Overall diameters are the minimum allowed by the "Code" so that the maximum number of conductors can be pulled in a conduit. The finish is flame-resisting and prevents fire from traveling on the wire surface.

Use General Electric Code Wires and obtain all the features, which provide ease, safety, and economy in installation. For further information, see your nearest G-E Distributor or write Section W-328, Merchandise Department, General Electric Company, Bridgeport, Connecticut.

Tune in! Join the "G-E Circle" every weekday noon, D.S.T. (except Saturday) N.B.C. Network.

GENERAL ELECTRIC
WIRE AND CABLE
MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

A.E.I.

NEWS AND SERVICE
INFORMATION

MATERIAL FOR THIS DEPARTMENT IS SUPPLIED BY THE HEADQUARTERS
STAFF OF THE ASSOCIATION OF ELECTRAGISTS, INTERNATIONAL
420 LEXINGTON AVENUE, NEW YORK, N. Y.

President, L. E. Meyer
14 North Franklin Street, Chicago, Illinois

Vice President, Earl N. Peak
1603 West Main Street, Marshalltown, Iowa

**DIVISIONAL EXECUTIVE
COMMITTEEMEN**

Eastern	Great Lakes	Pacific
Louis Kalischer 288 Livingston St. Brooklyn, N. Y.	E. D. Brown 2470 Grand River Ave. Detroit, Mich.	F. O. Sievers 468 5th St. San Francisco, Cal.
Southern	Central	Eastern Canadian
D. B. Clayton 844 Martin Bldg. Birmingham, Ala.	F. T. Langford 511 S. Third St. Minneapolis, Minn.	R. A. L. Gray 85 York Street Toronto, Ont.
Southeastern	Mountain	Western Canadian
W. W. Ingalls 315 S. W. 10th Ave. Miami, Florida	R. R. Reid 1957 South 5th East Salt Lake City, U.	J. H. Schumacher 344 Main Street Winnipeg, Man.
Contractors Organized for Industry Welfare		

ELECTRAGISTS' CONVENTION, KANSAS CITY

Tentative Program

Sunday, October 9

- 9:30 A.M. Executive Committee Sessions
4:00 P.M. Registration opens, Hotel President

Monday, October 10

- 9:00 A.M. Closed Forum Session
(For Contractors and Dealers)
 2:00 P.M. Closed Forum Session
(For Contractors and Dealers)
 7:00 P.M. Dinner Dance

Page 2 of 11

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|------------|--|
| | Tuesday, October 11 |
| 9:00 A.M. | Closed Forum Session
<i>(For Contractors and Dealers)</i> |
| 12:15 P.M. | Luncheon at K. C. Athletic Club
Convention Delegates Guests of
Kansas City Electric and Radio
Association |
| 2:00 P.M. | Motor Specialists' Meeting |
| 7:30 P.M. | Annual Banquet and Entertainment |

Wednesday, October 12

- 9:00 A.M. General Convention Session
(Open to all Groups of Industry)
1:30 P.M. Annual Electragist Golf Tournament
Meadow Lake Country Club

HEADQUARTERS CLOSES FOR VACATIONS

As has been the custom for many years, the headquarters' office of the A. E. I. will be closed for two weeks vacation period from August 20 to September 6. Orders for supplies or other important matters should reach headquarters by August 18, to permit of attention.

EXECUTIVE COMMITTEE TO BE ELECTED

The terms of offices of the executive committeemen from the following divisions will expire at the Annual A. E. I. Convention at Kansas City on October 12, and their offices are to be filled by election by the delegates present from their respective divisions:

Division	Present Committeemen
Eastern.....	Louis Kalischer, Brooklyn
Southeastern.....	W. W. Ingalls, Miami
Great Lakes.....	E. D. Brown, Detroit
Mountain.....	R. R. Reid, Salt Lake City
Western Canada.....	

.....J. H. Schumacher, Winnipeg
Divisional executive committeemen are elected to serve for two years. The terms of office of the committee-men from the other divisions, and also of the president and vice-president, do not expire until the convention in 1933.

SIMPLIFICATION OF BOXES AND FITTINGS

As the result of an invitation extended by the A. E. I. to the Armored Conductor and Flexible Metallic Conduit Section, NEMA, the National Electrical Manufacturers Association have appointed a technical committee to meet with a similar committee from the A. E. I. for the purpose of discussing improvements in design and standardization of parts entering into the complete armored cable and flexible metallic conduit wiring systems.

The first meeting of this Joint Technical Committee was held on Thursday, July 14, for preliminary discussion, looking toward a basis for simplification of box standards.

The members of the technical committee representing the manufacturers are as follows:

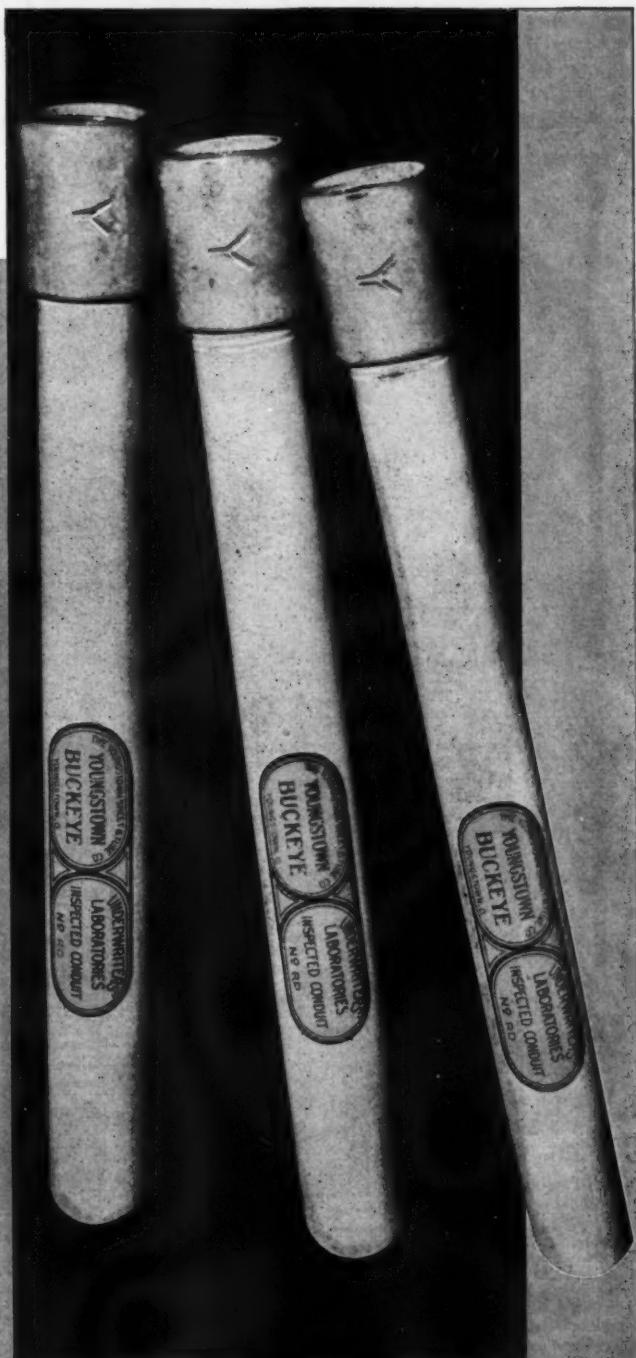
George Carlson, General Electric Company; H. M. Dreher, Triangle Conduit Company; O. A. Frederickson, National Electric Products Corp.; J. A. Kennedy, Anaconda

YOUNGSTOWN BUCKEYE CONDUIT

HOT GALVANIZED

ELECTRO GALVANIZED

BLACK ENAMELED



THE YOUNGSTOWN SHEET AND TUBE COMPANY
GENERAL OFFICES . . . YOUNGSTOWN, OHIO

"By Actual Comparison We Have Found DUTCH BRAND Tape Superior"

Says H. E. ANDERSON

University Electric Company, St. Paul, Minn.



MANY contractors do not take the time or have the opportunity to compare the efficiency of tape as Mr. Anderson has done, but it would pay them to do so. **DUTCH BRAND** is a modern product in keeping with the progress of the industry. Its "Extra Service" qualities are not just advertising talk. **DUTCH BRAND** actually possesses all these desirable features.

1. Manufactured by our own 4 ply saturation process. Not 2 coats or 3 coats of compound, but 4 plies of rubber uniformly applied that give it exceptional adhesiveness and long life in any climate.
2. The 4 ply process eliminates pin holes and insures extra insulating safety. One thickness of this tape resists 2300 volts.
3. The edges do not fray. Every inch is clean cut and usable right down to the core, no waste.
4. It is made on a base of tough close-woven sheeting that brute strength can't easily break.
5. Its great adhesiveness is always fresh. It lasts and is not of the gooey or messy type. It won't dirty the hands.
6. It is neatly packaged in small sizes for the consumer and shop sizes for the contractor.

Compare **DUTCH BRAND** with what you now may be using . . . without obligation. Just clip the coupon below and we will send you free test rolls without cost.

DUTCH BRAND Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere



DUTCH BRAND Soldering Paste
A scientific mixture. Cleans as it works. Holds solder fast. Less paste required per job.

VAN CLEEF BROS.

Established
1910

Manufacturers **DUTCH BRAND**
Friction and Rubber Tape and
Soldering Paste
Woodlawn Ave., 77th to 78th Sts.,
Chicago, U. S. A.



DUTCH BRAND
Rubber Insulating Tape
Fuses instantly without heat. Moldes into one solid piece. It stretches without breaking because it contains 20% more live, new rubber.



Van Cleef Bros. Woodlawn Ave., 77th to 78th Sts., Chicago, Illinois		
Gentlemen: We would like to test the "Extra Service" qualities of the following DUTCH BRAND products:		
<input type="checkbox"/> Friction Tape <input type="checkbox"/> Rubber Tape <input type="checkbox"/> Soldering Paste		
Name.....	.....	.....
Kind of Business.....	.....	.....
Street Address.....	.....	.....
City.....	.....	.....
Jobber's Name.....	.....	.....

DUTCH BRAND FRICTION TAPE

Wire & Cable Company; A. Penn Denton, engineer-director, Armored Cable & Flexible Metallic Conduit Section, NEMA.

The A. E. I. was represented by the following members:

James G. Fox, Greenwich, Conn., Edwin M. Seaman, Mineola, N. Y., George H. Davis, Newark, N. J., Laurence W. Davis, general manager, A. E. I.

NEW MEMBERS

The following applicants have been accepted into the A. E. I. since the publication of the list in the July issue:

CALIFORNIA

San Francisco:

Lynn & Droit

MICHIGAN

Detroit: Southeastern Elec. Co., Inc.

CANADA

Montreal, Que.: Canadian Comstock Co., Ltd.

COST DATA COMMITTEE SURVEY

D. B. Clayton, chairman cost data committee, has completed a survey of the membership of the A. E. I., seeking to obtain the opinion as to the type of technical data and information and character of cost data for which there is the greatest need.

The following types of work appear to be the field in which members would like to obtain cost studies and exchange data through the services of Mr. Clayton's committee:

- Underfloor ducts
- Conduo base
- Bus construction
- Underground duct work
- Lead cable pulling
- Low tension equipment, as
- Clock systems
- Fire alarm systems
- Nurses call systems
- Signal systems
- Transformer systems
- High tension work, as
- Transformers
- Oil circuit breakers
- Switchboards
- Switchgear
- Lightning arresters
- Building distribution
- Outdoor switching apparatus
- Industrial wiring data
- Line construction
- Metal moulding
- Electrical metallic tubing

Any contractors who will cooperate with the Cost Data Committee in supplying labor cost data on any of the above types of wiring of construction work, are requested to write to D. B. Clayton, chairman, 844 Martin Building, Birmingham, Ala.

ARROW CORD SETS

for the 5,000,000-set market existing TODAY

Packaged for
COUNTER DISPLAY
as illustrated →

Made with



Kant-Kink
ELASTICORD*



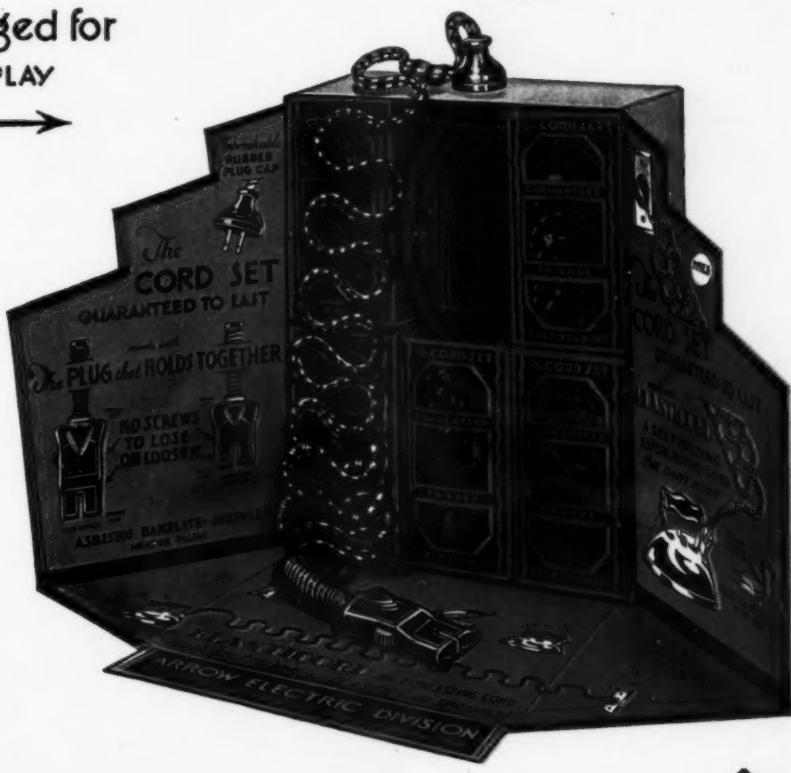
SCREWLESS
Heater Plug



Unbreakable
Rubber Cap



GUARANTEED
for One Year



*ELASTICORD is a product
and trade-mark of
The United Elastic Corporation
of Easthampton, Mass. (parents)
(patents pending)
Long Life
Elastic → No
springs
in the cord

Here's a money-maker in TODAY'S market—with quality features that pull it out of price-competition and leave you a real profit. First feature: Kant-Kink ELASTICORD, 7 ft. 2 in. of self-folding heater cord kept free of kinks by elastic braided into the cord. Second feature: SCREWLESS Heater Plug of genuine Bakelite fastened together by spring clips; no screws to lose or loosen. Third feature: Pull-handle UNBREAKABLE rubber cap, wiring concealed. Fourth feature: A one-year GUARANTEE with each set. Approved by Underwriters' Laboratories. . . Each standard package of 12 sets forms the Counter Display pictured above. ASK YOUR JOBBER'S SALESMAN OR WRITE US FOR SALES PROPOSITION.

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

CONTRACTING

news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS
CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL
IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO
THIS DEPARTMENT

COMSTOCK RESIGNS GUILD PRESIDENCY

L. K. Comstock, organizer of the Electrical Guild of North America and president during its first two years, has resigned this office and has been succeeded by J. G. Livingston of New York.

Mr. Comstock was re-elected president at the annual meeting in May but presented his resignation on June 7, which was accepted at a regular meeting of the executive committee on June 27. At this latter meeting it was also decided to discontinue the research bureau of the Guild which was being conducted by J. A. Kelly. Mr. Comstock and Mr. Kelly practically handled all of the work of the headquarters office.

Inquiries of the officers of the Guild have failed to produce any statement as to its future course.

IMPROVEMENT IN MERCHANTISING ACTIVITIES OF UTILITIES

A questionnaire recently sent out by the Southern Minnesota Electrical Association disclosed the fact that the situation is somewhat improved regarding merchandising activities of the utilities.

Among other things disclosed were that most dealers sell electric refrigeration, and that the majority stated that discounts are inadequate to cover the sales and promotion expenses.

A great deal of adverse criticism against jobbers who solicit or accept business from persons or firms not primarily engaged in the electrical business was shown, and a special committee has been appointed to investigate these matters and work out

necessary improvements of this condition.

The fact that most small towns and many fair sized cities in Minnesota have no ordinances or licensing was also disclosed.

Forty questionnaires were returned.

DRAFTS ORDINANCE FOR APPROVED MATERIALS

The drafting of a new electrical ordinance specifying that all contractor-dealers selling electrical merchan-

dise and supplies shall have a license and handle only approved materials is one of the major activities of the reorganized Flint (Mich.) Electrical Contractors Association. The ordinance will also incorporate the examination of electrical contractors before issuing a license.

Another important activity is working with the union and meeting with them on working rules, etc., to the effect that the association will be a closed shop organization.

The officers of the association are Paul F. Schagane president; J. Teague vice-president; Robert Cook, treasurer and Charles LeMire, secretary.

SAN FRANCISCO REGISTERS PLANT ELECTRICIANS

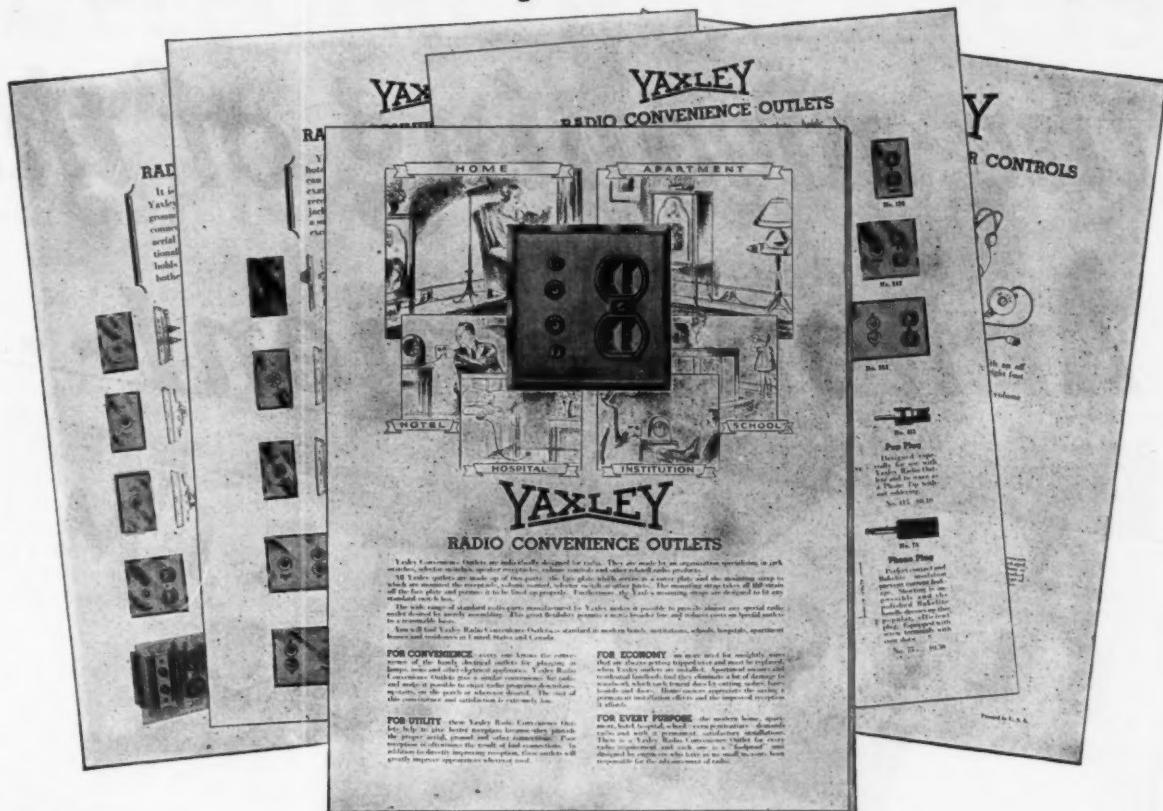
A new electrical ordinance has just been passed by the city and county of San Francisco after some months of preparation by members of the electrical industry, some of the general features of which are as follows:

Although it embodies the National Electrical Code as the basis for most of its wiring regulations, the new ordinance provides for additional



CONTRACTORS HEAR SPEAKERS BEFORE MEETINGS: Various groups in the Toledo Electrical Contractors Association hold weekly meetings which are preceded by a dinner and a thirty-minute talk by some representative of a manufacturer or jobber, or any speaker who has a message for the group. This picture shows one of these groups. Standing, left to right: Clarence H. Rady; Clarence F. Hammer, association manager, and Ed De Lisle. Seated: Walter Eggleston, Walter S. McKie, H. G. Bogart, General Electric refrigeration distributor, who addressed the meeting, and Max Romanoff.

Here's Complete Information



About the Complete Line of Radio Convenience Outlets

Produced by America's Pioneers in Radio Development

Made by an organization specializing in the development of that which is best in selector switches, speaker receptacles, volume controls and other related radio products. It is only natural that the line of Yaxley Radio Convenience Outlets should be distinctly designed for the purpose for which they are intended.

You'll find Yaxley Radio Convenience Outlets in modern hotels, institutions, schools, hospitals, apartment houses and homes. You'll find that Yaxley offers a broader line—a line that means a wider market, increased sales and greater profit.

This new eight page, illustrated folder (shown above), tells why Yaxley Radio Convenience Outlets mean greater convenience, economy and utility for every man who uses them—and more business for every man who sells them.

Write for it today!

This Yaxley Selector Switch, Volume Control and Speaker Jack is daily demonstrating its advantages in large installations such as are required by hotels, hospitals and schools. All parts are mounted on supporting straps separate from the face plate. The complete unit fits in a standard two-gang switch box.



YAXLEY

YAXLEY MANUFACTURING CO., Inc.
Division of P. R. Mallory & Co., Inc.
INDIANAPOLIS, IND.

Thousands now know the meaning of this Announcement...

**ELECTROTRIM
WINS!**

APPROVED 2-WIRE NON-METALLIC ASSEMBLIES
NOW PERMITTED BY ELECTRICAL COMMITTEE OF THE N.F.P.A.

New York, June 10, 1932.—A. R. Sma,
Chairman Electrical Committee, declare:
new section No. 516 concerning Non-Metallic Surface Extensions adopted in accordance
with Interim Revision Procedure

This MEANS—the successful conclusion of nearly two years of effort on the part of Electrotrim to secure the Electrical Committee's sanction of the use of non-metallic surface extensions such as Electrotrim.

Electrotrim has already been submitted to the Underwriters' Laboratories for final test and approval and will be considered by them as soon as the standards are promulgated for judging materials to be installed under the new code.

ELECTROTRIM, INC. UNION CITY, N.J.

...do You?

THE NEW RULES
BULLETIN NO. 20

June 10, 1932 [Article 1—Section 516]

516. Non-Metallic Surface Extensions.
a. Semiportable two-wire assemblies approved for such purposes may be used as extensions to existing convenience outlets on lighting and/or appliance branch circuits only in proposed dry locations, residence or office occupancies.
b. Attachment of such extensions to existing convenience outlets shall be by plug connectors approved for such purpose.
c. Such extensions shall be attached only to the surfaces of interior woodwork or plaster finish and shall not be installed as concealed wiring or run through or over partitions unless installed where subject to moisture or corrosive vapors not installed in contact with any piping, metal work, or other conductive material.
d. Such extensions shall not be made on circuits having less than 150 volts.
e. Individual extensions shall not run more than 20 ft. in either direction from the existing outlet, and may have a maximum of three receptacles provided that the total outlets on the branch circuit including those on the extension are not over 12.
f. Such assemblies shall be secured between outlets on the surface wired over by tacks, screws, small nails or other approved means of attachment of not more than 6 inches, except that the assembly shall not be secured within 6 inches of a corner. The heads of such nails or screws as come in contact with the conductors in the assembly shall not exceed in width one-half the space between the conductors in the assembly.
g. Receptacles and other fittings shall be of approved type and secured to the surface wired over by suitable screws. The end of the assembly on such an extension shall terminate in an approved receptacle which covers the ends of the wires in the assembly. All angle bends which reduce the space between conductors shall be covered by an approved cap securely attached to the surface wired over.
h. Such extensions shall be made in continuous lengths without joint splice, tap, or exposed bare conductors.

**THIS &
PRO**

This & Comm. biggest wiring at one It me not e of E on the and all

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*... here is a brief statement
of the ELECTROTRIM FACTS
that have enthused the entire
ELECTRICAL WIRING FIELD!*

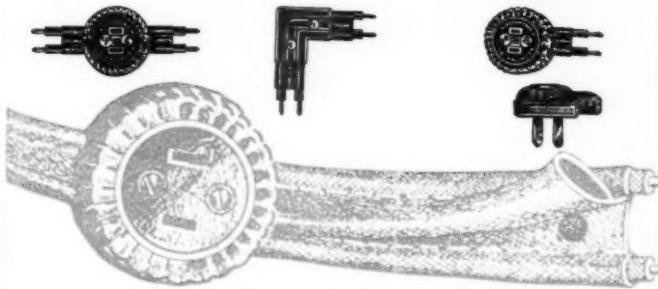
What It Is—

ELECTROTRIM is made of rubber covered standard No. 14 stranded wire enclosed in a stitched covering of high quality insulating material which is flame-proof, water-proof, tough and durable. ELECTROTRIM is the answer to the demand for a safe, modern electrical wall outlet to replace dangerous, unsightly cords straggling around the room.

ELECTROTRIM lies flat and can be carried snugly around corners. It is easily applied with standard 6 oz. flat head tacks or special fastener, the heads of which are concealed by the center bead. ELECTROTRIM and its fittings are finished in four beautiful colors—(white, oak, ivory, mahogany) to harmonize with wood-work, walls, or ceiling.

Easy to Sell

The demand for ELECTROTRIM does not need to be created—it is here. To show ELECTROTRIM is to sell it. ELECTROTRIM sales and merchandising plans include a free display rack which holds and displays 300 feet of ELECTROTRIM in 3 assorted colors, a free display board showing the actual use of ELECTROTRIM and its fittings, and advertising folders giving the dealer the easiest selling, biggest profit item in the electrical wiring field.



Quick Facts

Approved non-metallic 2-wire extensions now permitted by Electrical Committee of N. F. P. A.

ELECTROTRIM, the outstanding 2 wire non-metallic extension meets the tremendous existing demand for low cost electrical wall outlets.

Not a substitute for concealed wall outlets. Intended for surface extensions only. A new source of income for electrical contractors.

BIG PROFITS not only in sale of ELECTROTRIM, but also ELECTROTRIM fittings and installations.

Increases sales of electric appliances by making the needed additional wall outlets inexpensive.

A Tremendous Market

Practically every home and office in America needs and will buy ELECTROTRIM. For ELECTROTRIM not only meets the modern demand for harmonious room decoration, elimination of unsightly light cords and more numerous wall outlets **but** is so moderate in price that all can afford to specify it.

Priced right to sell a waiting market of more than 40,000,000 homes and offices—that need only to see it to buy it.

HERE Are Profits . . .

One sale of ELECTROTRIM itself brings you more profit than several sales of ordinary flexible cord—but that is only the beginning. ELECTROTRIM requires fittings—and there is a big profit here. Then ELECTROTRIM requires installation—with a nice profit for the contractor dealer.

All this is additional profit—new profits—profits you have never had an opportunity to make before. And when you sell more wall outlets you create new markets for more electrical appliances... With ELECTROTRIM you need never lose an electrical appliance sale because the would-be purchaser could not afford to have another wall outlet installed. Now you can sell ELECTROTRIM wall outlets at the price users can afford to pay.

Special Introductory Assortment Details to Those Who Return the Coupon NOW!

ELECTROTRIM, INC., Dept. E. C., Union City, Ind.

With the understanding that there is no obligation, rush me the ELECTROTRIM samples, prices, and details of your Special Introductory Assortment Offer.

Name _____

Address _____

City _____ State _____



FIRST IN EMPORIA:—M. W. Schoettler of Emporia, Kan., is our idea of a salesman. His first wiring jobs back in 1907 were done before the power line was built. Schoettler sold customers on the idea that in time the power line was coming and the advantage of having the work done at the time to avoid the rush.

FRINK SIGNS

Frink Illuminated Signs have become recognized as standard for visibility and beauty. Each is designed specially for an intended purpose. Infinite display treatments are possible.

THE FRINK CORPORATION

23-10 Bridge Plaza South, Long Island City, N. Y.

rules when deemed necessary, upon the following basis: The chief is empowered to call a meeting on ten days published notice to "determine generally accepted standards and methods governing electrical and fixture work, in modification of or supplementary to the rules and regulations of the National Electrical Code." After these have been ascertained they are to be published and will supplement the National Electrical Code.

The particular feature of the revised ordinance which originally caused its revision deals with the regulation of plant electricians and work done by owners on factory premises. The ordinance requires that plant electricians or owners be registered, pay a registration fee, and keep the department of electricity informed as to the name and address of the man in charge of its plant installation work. It also provides that master electricians or master fixture electricians elect a supervising electrician if they cannot themselves qualify for this position. This supervising electrician must pass the examination provided under the ordinance.

Changes in the fee schedule have been made to render the charges more equitable for motor and heating loads. Most of these are now placed on a kva. basis rather than on a horsepower basis.



AMERICAN STEEL & WIRE COMPANY

FLEXIBLE CORDS

Labeled — To Protect Customers

No more risk of handling hazardous Flexible and Heater Cords! Cords approved by the Underwriters Laboratories can now be positively identified by the "5 foot label," a narrow paper covered metal band clipped to the cord at regular intervals. Flexible Cords made by the American Steel & Wire Company are available bearing this form of identification.

This movement deserves your co-operation. You help yourself by helping the electrical industry cut down that 42% damage loss due to cheap, unsafe cords.

We will gladly furnish additional information upon request.

1831 1932

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

AND ALL PRINCIPAL CITIES

Empire State Bldg., New York

First National Bank Bldg., Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco Export Distributors: United States Steel Products Company, New York

"Conduit Bends at $\frac{1}{10}$ the Cost With the GREENLEE"



CAREY ELECTRIC COMPANY

Electrical Construction and Repair,
1407 SOUTH BROWN STREET
W DAYTON, OHIO W

May 11, 1932

Greenlee Tool Co.,
Rockford, Ill.

Gentlemen:

Last year we purchased one of your No. 770 Benders from the Nichols Electric Company to be used primarily on a job we had at the time. Our experience on that job proved so favorable that we have since been using the Greenlee Bender at approximately one-tenth the cost of any method we employed before. Furthermore, all the bends can be made cold which eliminates the objections of the inspection departments relative to the damaging of the enamel on the interior of conduits when hot bends are made.

After the job was completed and we made a check-up, we found that the Bender paid for itself in the saving of labor and not only in bending the conduit, but also in the elimination of delays which had always occurred in the past, delays caused by the workmen waiting on conduit to be cut and bent. By using the Greenlee Bender we found that the workmen were enabled to start a run of conduit and entirely complete the same in one operation.

We feel this is a tool that is a distinct advantage to any contractor who has any amount of larger conduits to install.

Yours truly,
CAREY ELECTRIC COMPANY
Prop. Clarence Carey

Mr. Clarence Carey, Proprietor,
Carey Electric Co., Dayton, Ohio.

WE have been told that every Greenlee Conduit Bender sold to date has paid for itself on the first job. Now, we won't vouch for such a statement, because it takes in a lot of territory. But, judging from the number of letters in our files that are similar to the one shown here from Mr. Carey, we are of the opinion that such a statement is fairly accurate.

However, we do know that on any job of reasonable size, a Greenlee Hydraulic Conduit Bender will pay for itself, thus

providing for greater profits on other jobs. This is because it is easily portable, makes bends faster and easier than by other methods, does not damage the conduit, and eliminates the need for many manufactured bends and fittings.

If you are not thoroughly familiar with Greenlee Benders, let us send complete information concerning them. There is no obligation, of course, and it may mean much to you on your next contract.

GREENLEE TOOL CO., Rockford, Illinois

GREENLEE TOOL CO.
Rockford, Illinois.

Please send complete information on
Greenlee Hydraulic Conduit Benders.

Name.....

Address.....

City.....

State.....

My Jobber is.....



Greenlee Hydraulic Bender for rigid conduit.
Built in two sizes. No. 770 handles 1½ to 3-inch conduit, and No. 775 bends 2½ to 4½-inch sizes.



Greenlee Hydraulic Bender equipped for thin-wall steel conduit. Bends 1¼, 1½ and 2-inch sizes, easily, quickly and without crushing.

EASTERN INSPECTORS TO MEET IN SEPTEMBER

The 1932 annual convention of the Eastern Section, International Association of Electrical Inspectors, will be held at the Hotel New Yorker, New York, September 28 and 29.

Nearly every branch of the electrical industry will be represented, in addition to inspectors, as the general committee is composed of representatives of contractors, wholesalers, manufacturers, central stations and civic associations.

A. Lincoln Bush is general chairman of the convention and Joseph C. Forsyth is honorary chairman. The financial end will be handled by Louis Kalischer, treasurer. F. N. M. Squires has been elected vice-chairman and Albert A. A. Tuna, secretary.

On Wednesday, September 28, a meeting and joint luncheon has been scheduled with the Electrical Association of New York. The annual banquet will also be held on Wednesday.

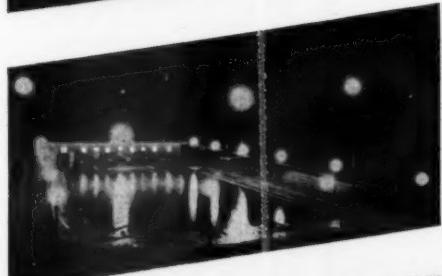
SURFACE EXTENSION RULES CORRECTION

On page 60 of the July issue of Electrical Contracting the new rules governing the installation of non-metallic surface extensions were erroneously given as Section 526. The correct number of the Section is 516.



IN BUSINESS ONLY ONE YEAR BUT:—In that short space of time J. M. Broswell, Commercial Electric Company, Savannah, Ga., has, through specialization, gained most of the electric refrigerator motor repair work in that city. Flat prices quoted in advance for a certain operation on a motor of a given size is one help in getting this business, he says. Mr. Broswell is secretary of the Electrical Association of Savannah.

Take Advantage of Summer to Sell G-E FLOODLIGHTS



Outdoor recreation will be at its height for the next three months. Check up on public monuments and swimming pools; visit the filling stations—city and rural; above all, start a neighborhood campaign among residents who have lawns and grounds and garages. Explain the safety to person and property that they may obtain with G-E Handy floodlights—especially in this season of unguarded doors and open windows.

RESIDENCES

A personal demonstration at night of the G-E Handy and Senior Handy will impress likely prospects with the protection that these floodlights will throw around their homes and driveways and grounds.

FILLING STATIONS

A trip along neighboring highways will show you many opportunities to sell projectors because of the sales promotion that light always brings at night.

SWIMMING POOLS

Public swimming pools double their attraction when floodlighted. A visit to the proprietors should prove fruitful.

MONUMENTS

In parks and squares, the floodlighted monument gains new distinction during the hours when people are free for outdoor recreation. See park managers and public officials.

REMEMBER—you sell not only floodlights and lamps but also, as a rule, conduit, switches, transformers, and the work of installation. The General Electric Supply Corporation will back you up with the recommendations of G-E lighting specialists and "printed salesmen" for your promotional work. Address the nearest office of the G-E Supply Corporation; any other G-E Merchandise Distributor; any G-E Sales Office; or General Electric Company, Schenectady, N. Y.

710-164

GENERAL  **ELECTRIC**



Lunch rooms are among your best prospects for ventilation



*Exhaust and Ventilating Fans
9" to 60" Diameter*

LUNCH rooms, "diners" and small restaurants, usually operating 24 hours a day, are mighty good prospects for the sale and installation of exhaust, ventilating and ceiling fans.

These places are taking in the money and will spend some of it to attract customers through cleaner, fresher, more breatheable atmosphere.

DIEHL furnishes — through your wholesaler—a most complete and thoroughly applicable line of ventilating equipment, the product of fifty years specialized fan manufacturing experience.

Have you the DIEHL 1932 Catalog and booklets giving essential installation data?



New—32" and 36" Ceiling Fans in reversible or non-reversible types.

DIEHL MFG. COMPANY

Electrical Division of

THE SINGER MFG. COMPANY
Elizabethport, N. J.

Atlanta Boston Chicago
New York Philadelphia

DIEHL fans



GRAIN ELEVATOR SPECIALISTS: About the only time W. F. Hupp of Electric Motors Co., Cedar Rapids, Iowa, does not smoke a cigar is when he is on the job in a grain elevator or a mill, and in the past sixteen years there have been quite a few such installations put in by this firm all over the state of Iowa.

OTTAWA ASSOCIATION MEMBERSHIP GROWS

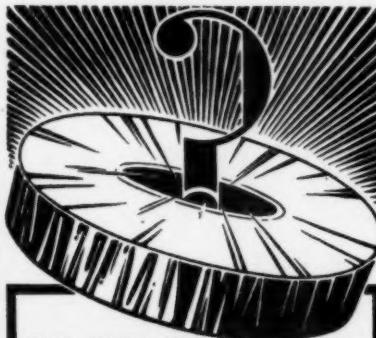
The membership of the Ottawa (Can.) District Electrical Association now numbers fifty and new members are being added right along. The association, which meets monthly, always arranges to have a guest speaker address the members, after a short discussion on local topics by the members.

REVIVES "HI-JOLTAGE" NEWS LETTER

The Electrical Contractors and Dealers Association of Southern California, with offices in Los Angeles, is once more publishing its news letter "Hi-Joltage." This letter contains news of the activities of the association, as well as many articles relating to other activities throughout the industry.

MARKER FOR REEXAMINATION SERVICE INSPECTION

There are many devices and materials listed by Underwriters' Laboratories to which its label service form of inspection is not applied but which are inspected under the Laboratories' Reexamination Service. In order to provide a more positive, convenient and immediately available means of determining whether or not these items are listed, the Laboratories have now made available,



WHEN IS A TAPE NOT A TAPE

IT'S easy to think that "tape" is just tape." It's easy to accept the first tape that's offered. But there's a difference between tapes and sometimes this difference is very marked.

Tape is really not a tape, for instance, when it lacks or when it loses tensile strength, adhesive-ness or any of the other properties a friction tape should have. And when you put Panther and Dragon Tapes to the tests for tensile strength and for adhesion—both before and after ageing—you will see what difference in quality of tape can mean.

They are tapes, in fact, which are not only different in quality, but different in appearance. They do not even look like other tapes. Wrapped in glistening cellophane to keep them fresh, with a distinguishing green core that marks them apart even when the roll is partly used, Panther and Dragon not only hold first rank in tapes, but look the part.

Hazard Insulated Wire Works
Division of
The Okonite Company
Passaic, N. J.



for use under suitable regulation, a marker to be applied to such goods. This marker which is a circular design bearing the words "Listed under Reexamination Service, Underwriters' Laboratories," is to be attached to the goods or to appear on the carton or other container in which the device or material is sold.

HARRISBURG CONTRACTORS ELECT OFFICERS

The following officers were elected by the members of the Electrical Contractors-Dealers Association of Harrisburg, Pa., and vicinity for the coming year:

C. M. Davis, Harrisburg, president; Harold Shearer, Camp Hill, Pa., vice-president and R. A. Snyder, Steelton, Pa., secretary-treasurer. The trustees elected are J. Q. A. Brownell and Charles Houdenshield of Harrisburg; W. R. Forney, Mechanicsburg, and Lester Holler of Camp Hill, Pa.

DENVER CONTRACTORS RE-ELECT OFFICERS

At its annual meeting held May 19, the Denver Electrical Contractors' Association re-elected its officers as follows: J. R. Collier, president; Wm. A. Guscott, vice-president and L. A. Vosmer, secretary-treasurer. B. W. Stiles was elected to the present board to replace the late E. C. Headrick.



A REAL SPENDER:—Pierre Hough, treasurer and purchasing agent for H. H. Walker, Inc., Los Angeles, Cal., in the course of his 12 years association with this industrial contracting concern has purchased approximately \$10,000,000 worth of construction materials. The company specializes in "Class A" work, such as the wiring of hotels, office buildings, industrial plants and the like. They also manufacture ornamental street-lighting posts. Mr. Walker started the business in 1912. Mr. Hough was formerly with Loomis Bros., general contractors, Cedar Rapids, Ia.

What to Sell?

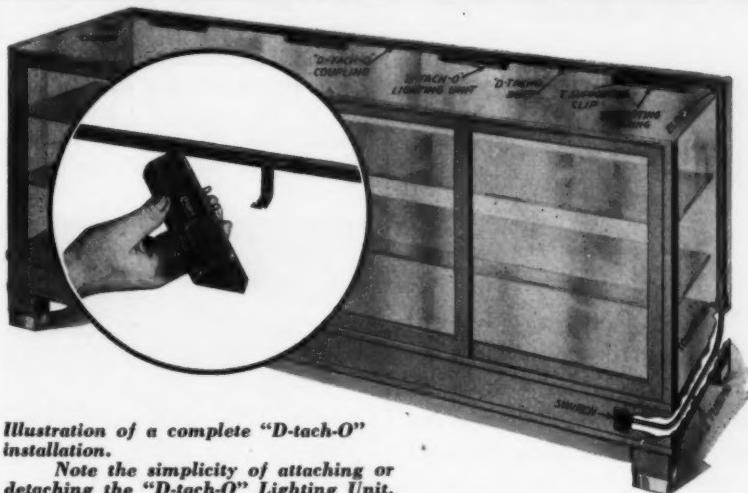


Illustration of a complete "D-tach-O" installation.

Note the simplicity of attaching or detaching the "D-tach-O" Lighting Unit.

"D-tach-O"

IS THE ANSWER TO YOUR PROBLEM

A modern product with distinctive improvements for which there is a growing demand and that offers an unusual opportunity for more and profitable wiring jobs.

Get all the facts from your distributor or fill out and mail the coupon today.

The WADSWORTH ELECTRIC MFG CO INC

Covington, Kentucky.

Safety Electric Switches

Display Case Lighting

Please send Catalog No. R80 and Bulletin B97.

Name..... Address.....

City and State..... My Jobber is.....

THE NEW LUGS NEMA-NELA

by Sherman



2-Hole Standard Duty Lug

COPLYING exactly with suggested specifications for Standard and Heavy Duty Lugs, July, 1932, Nema Publication No. 101—Nela Publication No. 232.

Designed to meet the insistent demand of Light and Power Company Engineers for a standardized line of properly made lugs—and that would be interchangeable with cast lugs used on power apparatus now in operation.

SHERMAN INTERPRETATION of these specifications meets all requirements in the best and most economical way and provides a real contribution to the convenience of users at minimum cost.

Send for Bulletin No. 21.



4-Hole Heavy Duty Lug

**H. B. SHERMAN
MFG. CO.
BATTLE CREEK MICHIGAN**

PRACTICAL METHODS

ACCESSIBLE CONDUIT STOCK

It is easy to reach a piece of conduit in the shop of Carl Wallin, Omaha, Neb. His conduit stock is kept alongside his cellar stairs. If he



is upstairs and needs conduit he reaches down in the floor slot next to the stairs and picks it up. It is just as easy to reach in the basement. This plan applies only to full lengths.

AN EFFICIENT RADIO TEST BOARD

E. E. Evans, Eastern Electric Co., Columbus, Ohio, has in his shop the radio test board shown in the illustration. It was designed and constructed by his son, W. C. Evans, and J. W. Evans, the firm's radio service man.

Reading from left to right the units in the top row are as follows:

1. The four push buttons are used

on the instant tube checker. They put different shunts in the plate circuit of the tubes, to take different plate currents of various type tubes; also they shift the grid bias on the tube being tested. The rheostat below these pushes is used to balance out the normal plate current so that when one of the four is operated only the current due to the grid bias is read on the output meter. These tests give mutual conductance of the tube, which is of the utmost importance in accurate tube checking.

2. These sockets are used to check tubes and are of various types to accommodate different style tubes. The two on the bottom are for short checking. Each socket in the group of 11 gives the same test.

3. These meters provide tests including continuity, resistance, condenser test, output, high and low, A.C. and D.C. voltages. Additional jacks make it possible to plug resistances and shunts into the test without changing any wiring on the back of the board.

4. These two rheostats are used to control the voltage of a "B" eliminator, which brings out D.C. voltages for different tests or checking battery operated sets.

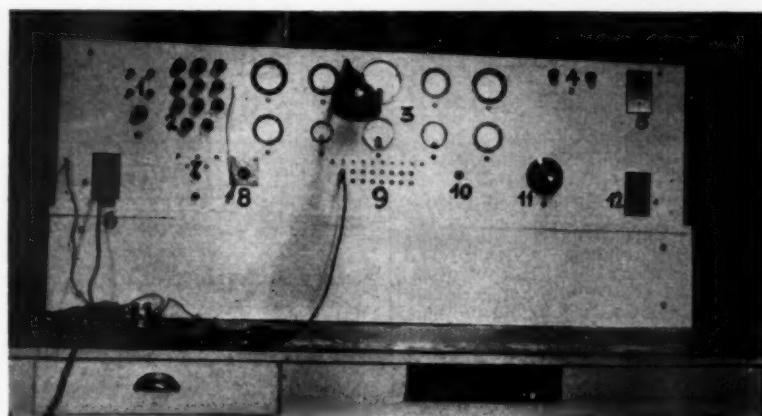
5. A single-pole switch with pilot light to control all the 110 volt circuits on the board.

6. A convenience outlet for plugging in radio sets, electric soldering irons, etc.

7. Small lights to indicate the type of short within the tube.

8. Rheostat to control the voltage of the various sockets of the tube checker.

9. These jacks are connected to each meter and to each test on the board. They are so arranged that, when a meter is plugged in, the pilot



light underneath will light. By bringing each meter and each test to a jack a very flexible arrangement is obtained.

10. This light is used for protection of the meter when testing a condenser, as a preliminary short test.

11. Dials for controlling the setting of the oscillator for the various frequencies used in aligning a radio set. Oscillator is located on rear of board.

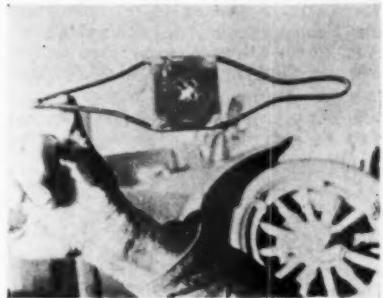
12. Convenience outlet, same as No. 6.

The drawers in the bench are used to hold tools.

The use of this board has resulted in economy of labor, increased accuracy and the speeding up of test and repair jobs.

READY DIE STOCKS

No changing of die stocks for P. A. Brown, Denver, Colo. He brazes a piece of strap iron around the dies which he uses frequently—and there



is his stock, always ready. Notice that the four corners of the dies are brazed. The home-made stock is in one piece and the ends are brazed together.



CONDUIT BUMPER:—There is more than one use for conduit, according to J. R. Katz, Omaha, Neb. He uses 4-in. conduit as a rear bumper for his truck. Bending this heavy material was avoided by using standard elbows and welding them to the straight lengths.

MURRAY SWITCHES

The pioneers in accessible fuse switch manufacture announce new and advanced design of "one operation" meter, entrance and polyphase switches.

The new switches have dual switch contacts with arc quenching, are side handle operated, and bases are not mounted with back of cabinet, thus assuring even greater ease in wiring.



Meter Service Switch
Catalog No. 1065
60 Amp. 125-250 Volt,
3 Wire, 2 Cart. Fuses,
2 Blades, Solid Neutral.

Murray Switches assure speedy work. Speed is essential in this age of keen competition. Murray Switches with their "plenty of knuckle room" feature, assure easiest wiring and with easiest wiring comes SPEED.

Wherever an "Approved List" is issued you will find Murray O. K.

The coupon is for your convenience in requesting catalog

METROPOLITAN DEVICE CORPORATION
1250 ATLANTIC AVENUE
BROOKLYN • NEW YORK

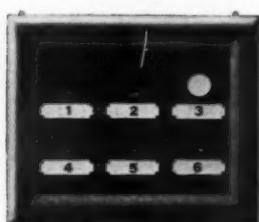
Metropolitan Device Corporation
1250 Atlantic Avenue
Brooklyn, N. Y.

Name.....

Address.....

Please send
Murray Switch Catalog

ANSONIA SPOT-DROP ANNUNCIATOR



No. 330 SPOT-DROP

Here is a new ANSONIA annunciator electric reset. Designed with only one moving part and no latches or contacts it has been made nearly troubleproof. It may be operated as automatic reset up to twelve drops or as regular electric reset up to thirty-five drops on either A.C. or D.C.

Without any cost or obligation, send me full particulars and prices.

NAME.....

FIRM.....

ADDRESS.....

Electrical Contracting, Aug. 32.

The ANSONIA
Electrical
Company
Ansonia, Conn.



ANNUNCIATORS • BELLS • BUZZERS
PUSH BUTTONS • WIRE

A ROLL ' TAPE

ELECTRICAL FLASHES
GATHERED AMONG THE
BIG WIRE AND PIPE MEN
BY
ELECTRICAL CONTRACTING'S
FIELD EDITORS

SALLWOOD'S Electric Shop, Kansas City, Kan., carries a stock of lamps in their repair truck and are able to sell extra lamps to most customers on whom they call for repair work.

SOMETIMES a contractor goes a long ways to do a small job. Carl Wallin of Omaha went 1350 miles out and back to repair a 2300 volt generator that furnished lights for a small town and power for a gold mine in Wyoming. The job only took a few hours but a mine flood was prevented.

BERT P. CRAWLEY, Peoria, Ill., wins this month's comment for thoroughness. When he was figuring a tennis court floodlighting job he had a



WIRES LARGE HOSPITAL:—Paul H. Honold of the Chas. A. Honold Co., Sheboygan, Wis., is shown going over the installation on a large hospital job his firm is wiring in Sheboygan. He has been in the electrical business in Sheboygan about nineteen years.

couple of tennis sharks from the state university come down to tell him how they, as tennis players, thought a court ought to be lighted. "We appreciate the advice of engineers," said Crawley, "but it is tennis players who will use these courts, so we have them tell us how they believe we can place the lights to the best advantage for their game."

CONTRACTORS of Marin County, Calif. recently organized the Marin County Contractors' Association, with Harry Eklund, electrician of San Rafael, as president, and Gene Bogle, of Bogle Electric Co., San Rafael, as secretary-treasurer. Meetings are held monthly.

In the office of the Byck Electric Co., Savannah, Ga., there is a series of interesting advertising blotters that were mailed to customers each month as an advertising medium. In addition to having a calendar for the month each blotter had a photograph of some large building wired by this company.

THE Ranier Electric Co., of Seattle, Wash., moved its place of business the latter part of April from 1109 3rd Ave. to 809 Olive Way. This is in line with curtailment of expense, although they are getting for less money a place nearly as large and in a location that will be practically as good from the standpoint of their retail business.

MUCH has been said about proper lighting and its benefits to mankind, yes and its benefits to growing poultry, but it remains for Louis Vlcek of the Sterling Electric Company, Omaha, to give the poor fish a break. He recently did a \$750 aquarium lighting job. Now the fish avoid eye strain and never miss a worm in the tanks so well lighted by Sterling.

THE Jordan Electric Company, Topeka, Kan., has added considerable volume to their business through selling fans for installation in furnaces during the fall of the year. Anyone who has paddled down to the furnace in pajamas and slippers and fought with an obstinate furnace at daybreak will understand the appeal of quick heat offered by a furnace fan.

FEELING that most of the misunderstanding about range wiring costs is due to lack of appreciation of the actual items which go into an installation, Jack Kohl, manager of the Sterling Electric Company, Sacramento, Cal., has made it a practice to prepare a complete cost sheet on each range-wiring installation he makes for the power company or for merchandise distributors. These detail sheets are turned over to them so that a better appreciation of these costs can be built up. Even the type of material,



THE REVIVAL OF A QUAIN'T CUSTOM

It is just as important to forget some things as it is to remember others—Let's forget the headaches of the past and remember that there are no satisfactory substitutes for truth, confidence, and intelligent effort consistently applied to one's business.

JUST COMMON SENSE

It's time to get back to fundamentals—to common sense truths from which we should never have strayed. Let's revive the quaint custom of working to make money, not merely to make sales.

BACK TO PROFITS!

If you are interested in more profitable business rather than just more business we will gladly send you our latest booklet "Profit—Your Silent Partner." It's yours for the asking, but since this Service is supplied only to those actively engaged in the electrical business, please attach your letterhead to the coupon below.

Henderson-Hazel Corporation,

5005 Euclid Avenue,

Cleveland, Ohio.

Gentlemen:

Without obligation please send us your booklet, "Profit—Your Silent Partner."

Name.....

Address.....

City..... State.....

E.C.-8-32

FRETZ-MOON R/G/D CONDUIT



Photo by Acme

**FRETZ-MOON CONDUIT
on WORLD'S LARGEST
SUSPENSION BRIDGE**

Line upon line of Fretz-Moon Hot Dipped Galvite Conduit stretch across the 3568-foot span of the George Washington Memorial Bridge over the Hudson River between 178th Street, Manhattan and Fort Lee, N. J. Owner—Port of New York Authority. Electrical Contractor—Wimpie Electric Co. This easy-bending, smooth-cutting and wear-resisting conduit cuts down installation and wiring time, and its time-defying zinc coating reduces maintenance costs to a minimum.

FRETZ-MOON TUBE CO., Inc., Butler, Penna.

***Beating Competition
with Brains***

Competition is tough in the electrical contracting business these days; and every day it gets worse. Successful contractors have found they can beat fly-by-night competition best by using their brains, and by educating their responsible employees. You can help your head men to keep abreast of the times and save you money by sending each his own copy of ELECTRICAL CONTRACTING.

whether of first or second grade, is specified, so that comparisons can be made. Mr. Kohl thinks that if more contractors followed the same plan, their position would be very much improved.

JAMES A. Atwood, electrical contractor of Dayton, Ohio, six months ago dispensed with company owned delivery trucks and service cars and has in that way effected an operating economy of about \$150 a month. His place of business is located in the main business section of Cleveland, and since the company does only wiring and repairs, it occurred to him that it would be cheaper to use 25-cents-a-ride cabs when his men made service calls, and to use the transfer companies for trucking operations on heavier materials and equipment. In a pinch Mr. Atwood can always use his personal car to take a man out to the job.

WHERE does the average contractor have the best opportunity? Big city or small town? You won't get rich in a small town, but on the other hand if you have the right location you will make a profit on every job and be rated as one of the leading business men in the community. I talked with one chap who has the only electrical business in a small town near Denver. He came here seven years ago with \$75 and a desire to settle down. Now he has a fine wiring, merchandising, and battery business, doesn't owe a cent and finances his own paper on refrigerators. The right man in the right small town has a fine opportunity in the contracting business—even today.



COLLECTING FROM SLOW ACCOUNTS:—Of course no Florida contractor there during the late boom escaped many uncollectable accounts, but the Newell Electric Company, Orlando, has fair success due to the fact that they employed a collector on commission who was able to both collect money and retain the good will of the customers. E. D. Little, left, and J. J. Newell seen in the photo.

MINERALLAC PRODUCTS



HANGERS FOR CABLES & CONDUITS

Easily the best for quick, low-cost installation work. Send for full details and costs.

1 Hanger without Porcelain Bushing. Spring steel; stronger, quicker, more compactly arranged.

2 Hanger attached to steel beam with bolt and nut.

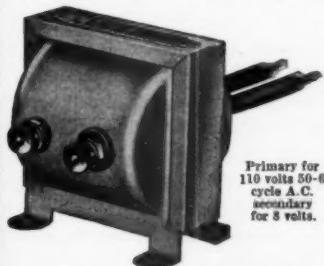
3 Jiffy Clip—quicker, neater work at less cost.

4 Cable Joint or Pot-head Compound—8 grades for every system, underground or overhead.



MINERALLAC ELECTRIC CO.
25 North Peoria Street, Chicago, Ill.

TROUBLE - FREE TRANSFORMER



Primary for 110 volts 50-60 cycle A.C.
secondary for 8 volts.

Assure dependable service by installing a Liberty Transformer. Approved by National Board of Fire Underwriters and fully guaranteed.

There is a Liberty Transformer, bell or buzzer for almost every requirement.

LIBERTY LINE

CLIP AND MAIL NOW

THE LIBERTY BELL MFG. CO.
Minerva, Ohio

Gentlemen: Kindly send me bulletins and price lists of your complete line of Bell and Buzzer combination, Bells and Buzzers. Also your new Trouble Free Transformer.

Name.....
Address.....
City.....State.....

IN THE EDITOR'S MAIL

A FAIR GENERAL CONTRACTOR

Editor,
ELECTRICAL CONTRACTING:

We recently received an invitation from a Chicago builder, N. P. Sevren Co., to bid on a job, and were particularly gratified with one paragraph of their letter.

As it deals with one of the most vicious evils of building construction we believe that it is worth calling to the attention of the industry that the word "Ethics" is still in the dictionary of one builder, not, however, in New York.

We quote the paragraph in question.

"Please note that we value subcontractor's bids, and because it is the ethical and fair procedure to follow, it has always been our strict policy not to solicit, receive or consider bids on subcontracts from subcontractors who did not figure the work prior to the letting of the general contract—this job will be no exception."

Bid shopping has put many subcontractors on the rocks, lowered the quality of construction, and nearly killed the incentive of most of us to bid on competitive work.

During the present unsettled conditions we feel that it is timely to recognize and commend the established policy of one fair dealing builder.

H. MARSHALL SMITH, Pres.
S. Edw. Eaton & Co., Inc.
New York, N. Y.



PIONEER MOTOR SPECIALISTS: Frank H. Owen, pioneer motor specialist of Pomona, Calif., has just moved to new and much larger quarters. Associated with Mr. Owen are A. G. Anderson, shown above, and O. W. Hill.

The RALCO LINE WIDENS YOUR PROFIT MARGIN

RALCO offer a line of explosion resisting Receptacles and Plugs, explosion resisting Junction Boxes and Fittings. All tested by the Underwriters' giving you assurance of satisfied customers. A part of the RALCO Line is shown below—priced to enable you to compete at no sacrifice of 100% performance on the job.



No. 52-EP

The No. 52-EP RALCO Interlocked Explosion Resisting Receptacle for use in Class I Groups C and D; Class II Group G locations. Correctly designed, rugged and reasonably priced. Rating: 20 Ampere, 250 Volt. 1-H.P. 250 Volt A.C. 2-H.P. 250 Volt D.C.



No. ESX

The No. ESX Explosion Resisting Switches for use in Class I Groups C and D; Class II Group G locations. Also made with long handle for float switches. Rating same as No. 52-EP.



No. XPU-7

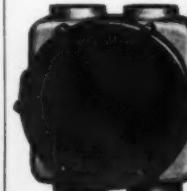
Junction Boxes for Class I Group D and Class II Group G locations.

The No. XPU-7 Explosion Resisting Junction Boxes with seven $\frac{3}{4}$ " openings. Three on bottom, one on top, one on back and one on each side.



No. XPG

The No. XPG Explosion Resisting Junction Box with six $\frac{3}{4}$ " openings, two on bottom, one on top, one on back, and one on each side.



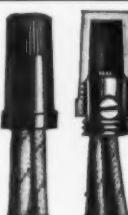
No. XPU

The No. XPU Explosion Resisting Junction Boxes with ten $\frac{3}{4}$ " openings, four on back, two on bottom, one on top, one on right and one on left. RALCO Boxes with Fittings make any installation easy and safe. For Fittings see July number of this magazine, or Bulletin No. 120-A.

Unions, Elbow Unions, Swivel Unions, Union Reducers, Swivel Union Reducers, Conduit Reducers 1" to $\frac{3}{4}$ ", Sealing Fittings and Plugs (square and flush) available for all Ralco Boxes.

RALCO MFG. CO.
125 N. Albany Ave., Chicago, Ill.
Send me catalogs on your line of explosion-resisting products.

Name.....
Address.....



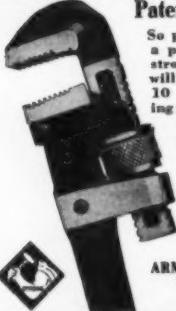
The MARR
Only insulated wire connector with brass binding screw contact.

Approved by Underwriters

Buy from your local jobber
FREE Sample on request

Write
THE RATTAN MFG. CO., NEW HAVEN CONN.
General Sales Agents
HATHeway & CO., 225 Varick St., New York City

ARMSTRONG BROS.
Patented PIPE WRENCH



So perfectly balanced it seems a part of you—a longer and stronger hand. So strong it will give a lifetime of service. 10 improved features, including: Heavy lugs (forged on handle) that will take up any side strain. No clumsy frame. Replaceable tool steel jaws. Nut can't fall out. Improved spring. Improved action. All Steel. Patented. This wrench has no weak point.

Write for Catalog P-10
ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
31 N. Francine Ave.
CHICAGO, U. S. A.

MARTIN

Portable Vise Stand and Pipe Bender



Made in Two Sizes
— small stand with chain vise 2 in. cap.; with hinged vise 2½ in. cap.
— Large stand with chain vise 4 in. cap.; with hinged vise 4½ in. capacity.

Do away with that make-shift bench and get the MARTIN with room anywhere... A genuine time-saver for cutting and threading pipe or conduit work. Write for catalog and approval. Write today.

H. P. MARTIN & SONS
Owensboro, Ky.

"STANDARDIZE ON STANDARD TRANSFORMERS"

•
ALL TYPES
Indoor and Outdoor Service

•
Send for
Descriptive Bulletin

STANDARD TRANSFORMER CO.
WARREN OHIO

NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

SELLS POLE LINE HARDWARE BUSINESS

The Ohio Brass Company, Mansfield, Ohio, announces that it has disposed of its line of wood cross-arm hardware, wood guy-strain insulators and steel insulator pins to Hubbard and Company, Pittsburgh, Pa. The latter company is licensed to manufacture and sell pole line hardware developed by Ohio Brass and protected by its patents. This is a manufacturing and sales arrangement only, and there is no financial interest of either company in the other. These materials, in the future, will be manufactured only by Hubbard and Company, although both companies will cooperate in the sale

of the devices. Future development work on this class of materials also will be carried forward by both companies.

OKONITE COMPANY PROMOTES OFFICERS

H. Durant Cheever, former president of The Okonite Company, Passaic, N. J., has been made chairman of the board of the company, while the position of president will be occupied by Frank Cazenove Jones. Mr. Jones was formerly vice-president and general manager of the company, and will retain his position of general manager.

Mr. Cheever has been with the company for forty-four years, starting with the Okonite Co. in the New York office. He became treasurer of the company and later president.

Mr. Jones entered the factory of the Okonite Co. at Passaic, and when he was elected treasurer of the company, was transferred to the New York office.

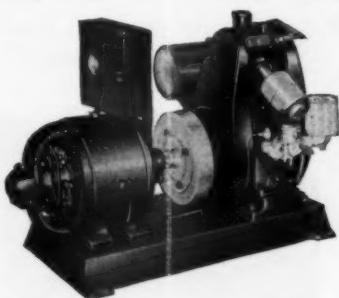


WIREMOLD TRAVELING EXHIBIT:—D. Hayes Murphy, president of The Wiremold Company, has had a small motor truck equipped as a traveling exhibit of the Wiremold line, and placed in charge of his two sons, who will spend their summer vacation demonstrating its features to contractors, jobbers, electrical inspectors, utility executives and architects, also window display experts and decorators. The exhibit is planned to show the application of Wiremold to its original field of surface wiring as well as to the new technique of decorative lighting and to the modern methods of window-lighting and merchandise illumination.

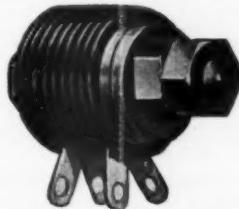
Appleton Electric Company, Chicago, has just published bulletin No. 1001, superseding Catalog No. 9, covering Appleton outlet boxes, switch boxes and miscellaneous conduit fittings. This bulletin contains photographs of each item, prices and weights.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces the appointment of E. F. Sells as manager of the Washington, D. C., office to fill the vacancy caused by the recent death of B. H. Hamilton. Mr. Sells has been associated with the

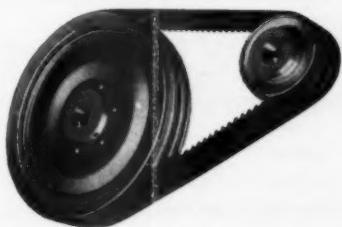
New Electrical Products



Kato Engineering Co., Mankato, Minn., announces a 1250 watt, 32 volt electric light and power plant for charging 14 to 16 storage battery cells. Unit can also be used for supplying light and power without batteries. It is equipped with a switch which automatically disconnects generator from batteries when engine is stopped. A resistor in generator field circuit makes it possible to adjust battery charging rate for small or large batteries. Unit has a 2½ h.p. 1800 r.p.m. motor which develops over 3 h.p. 2200 r.p.m.



B-L Electric Mfg. Co., St. Louis, Mo., announces three midget size dry, metallic rectifier units for use in connection with relays, electro-magnetic counters, laboratory instruments, time recorders, etc. Connections to unit are made by soldering to tinned lugs, and rectifier is mounted by means of the bolt which passes through discs. A small transformer is usually employed to furnish the required a.c. voltage for this type of unit. The F-24 unit is rated at ¼ amp. at 8 volts d.c. output for continuous duty and may be operated at a considerably higher current output for intermittent service. Type F-8 full wave rectifier is illustrated above.



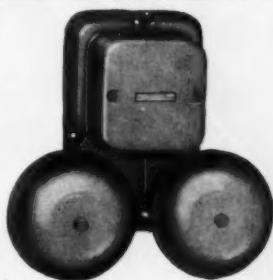
"Day-Steel" single and multiple V-groove pulleys for use with Dayton cog-belts, for ratings of 7½ h.p. and below are announced by the Dayton Rubber Mfg. Co., Dayton, Ohio. Pulleys are accurately formed from heavy gauge pressed steel, strongly welded both at rim and at web, and rigidly assembled with hub to give an accurately balanced and true running pulley. Pulleys have aluminum finish, and manufacturers claim they are much lighter in weight than ordinary pulleys.



Ansonia Electrical Co., Ansonia, Conn., announces an electric reset annunciator known as Spot Drop Annunciator Catalog No. 330, for operation on 6 volt, d.c. or 12 volt a.c. It is offered in 3 to 35 drops in steel case with standard finishes in mahogany, oak, black japan or white enamel. All latches and contacts have been eliminated and the movement has but one moving part. The target is a white disc appearing against black background, and any indication expressible in 12 letters may be had printed on a white card in individual card-holders. A feature of this annunciator is its ability to operate up to 12 drops as an automatic reset annunciator.



The General Electric Co., Schenectady, N. Y., announces a "Baby" floodlight with a lens of 6 in. diameter, which can be screwed on a 1½ in. pipe and can be readily adapted for lighting of signs or other applications where a pipe mounting is used. This floodlight is designed for use with a 150-watt lamp, and supplements a line of small units which includes the "Handy" with an 8 in. lens and the "Senior" with a 10 in. lens. Finish and material of reflector, casing and lens are the same as the preceding floodlights of that line.

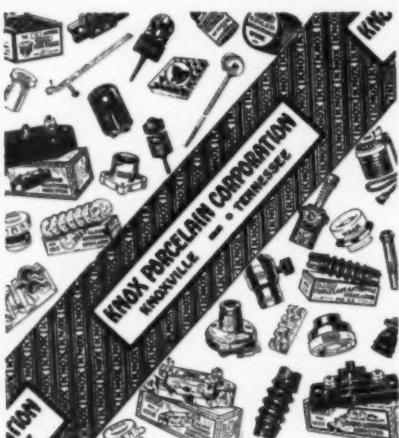


A weatherproof loudringing extension bell for telephone systems is being manufactured by the Kellogg Switchboard & Supply Co., Chicago. Only two connections are necessary to install bell. It is wired directly to desk set box or line so that any ringing signal coming over telephone line immediately operates bell. Unit has 6 in. steel gongs with weatherproof finish. The weatherproof housing consists of a heavy cast iron base with removable cast iron cover, held in place by two screws and finished with a coat of gray zinc paint. Bell has outside mounting holes eliminating the necessity of removing cover when installing it. Overall dimensions are 13 in. wide, 12½ in. high and 4½ in. deep and net weight is 13½ lbs. It can be used for either indoor or outdoor use, on either common battery or magneto lines.



New Connector Plug with Outside Springs

A "Heatproof" connector plug with contact pressure springs on outside of case, "modern" in appearance, has been produced by Cutler-Hammer, Inc., Milwaukee, Wis. The contact clips proper have no springs wrapped around, nor any springiness. Outside springs also serve to hold halves of connector together, eliminating the two screws and nuts commonly used for this purpose. It is claimed that this new construction shields the springs from heat. The two halves of plug actually separate when inserted on prongs of the appliance. Body of connector plug is made of "high-heat" Thermoplast.



Glass—Porcelain—Bakelite

KNOX

QUALITY ELECTRICAL PRODUCTS

DISTRIBUTED THROUGH JOBBERS

MANUFACTURED BY
KNOX PORCELAIN CORPORATION
KNOXVILLE --- TENNESSEE

THERE'S PROFIT TO BE MADE WITH
K A T O AC & DC
POWER & LIGHT PLANTS

\$99.00

and up
according
to size

MAIL THIS COUPON

Live wire contractors can secure profitable business with Kato A. C. and D. C. Light & Power Plants. You can sell them to farmers, theatres, hospitals and for sound truck and public address systems. Other places where you can find a ready sale are at airports, dance pavilions, summer camps, carnivals, on yachts and to railroads.

The smaller plants consist of a single cylinder 4 cycle air-cooled gasoline engine, connected direct to 110 volts, 60 cycle A. C. or D. C. generator. Plants 2,000 watts or larger equipped with 2 cylinder 4 cycle engines.

Clip the coupon below and learn how you can make extra money selling the Kato A. C. and D. C. Power and Light Plant to prospects in your territory.

KATO ENGINEERING CO.,
Mankato, Minn.Gentlemen:
Please send me your proposition and catalogs.

Name

Street

City State

Westinghouse company since 1911, serving a period of years in the Denver and El Paso offices of that company.

HENRY LYLES ZABRISKIE

Henry Lyles Zabriskie, chief engineer of the Diehl Manufacturing Co., Elizabethport, N. J., passed away at his home in Westfield, N. J., on the evening of July 10. A Cornell graduate, Mr. Zabriskie held engineering positions with the Fort Wayne Electric Co. and the Siemens, Halske Electric Co., before joining the Diehl Manufacturing Co. in 1903. He was one of the pioneers in the electrification of both home and industrial sewing machines and for many years as active in N. E. M. A. and other trade association work, serving on many important committees.

Containing engineering information and data never before published, a new, condensed catalog giving a simplified, comprehensive line-up of principal industrial rubber goods has just been issued by The B. F. Goodrich Rubber Company, Akron, Ohio. Among the condensed engineering data, is Table No. 1, Page 3, on rubber transmission belting, giving at a glance horsepower capacities, minimum pulley diameters, leather belt equivalents and list prices on all commonly used sizes of transmission belts.

Air-cooled transformers is the subject of a new loose-leaf bulletin sheet (Part 4B, Bulletin 172) issued by the Wagner Electric Corporation, 6413 Plymouth Ave., St. Louis, Mo. It describes Wagner types AC and AA units in sizes 1 to 50 Kv-a., voltages 100 to 600—and also discusses their application.

The B. F. Sturtevant Company, Hyde Park, Boston, Mass., has just released a new catalog on their speed heater-cooler, which is a two purpose unit—heating in winter, and cooling in summer. This unit is adaptable to many applications, especially restaurants and industrial installations. Catalog No. 390 gives a comprehensive story on its operation together with cooling capacity tables on the various sizes of units.

No More Code Troubles

This new handbook makes it easy to do any job exactly according to code



Just Published

ABBOTT'S National Electrical Code Handbook

460 pages, 4 1/4 x 7 1/2, illustrated, \$3.00

THE first handbook of its kind—simplifies the National Electrical Code—explains the rules, groups them for quick accurate reference. All rules applying to a given job are grouped together so that none will be overlooked. Long and involved rules are restated in simple language. Gives diagrams and definitions to make rules clear. Electrical World says, "So complete a working guide that it may well relegate the code itself to the status of a last court of reference."

Motor Tables Extended

The application of the Code data pertaining to the motor tables has been simplified by a complete set of tables that give for each size and type of motor the full-load current, wire size, conduit size, branch circuit fuse rating and the rating or setting of the running protective device.

Other Features

Other features of the Handbook that make it a practical, working tool for every user of the Code include data on—definitions of the terms used in the Code—requirements pertaining to standard materials and methods of installation—general requirements applying to all wiring systems—automatic overloads protection and in connection with specific applications—special requirements pertaining to outside work, hazardous locations—theatre wiring, elevators, cranes, signs, radio equipment, etc.—provides a practical means for systematic home study of the Code.

This coupon brings the book to your home or shop for 10 days FREE

Send it now!

McGraw-Hill Book Co., Inc.,
330 W. 42d St., New York, N. Y.
Send me Abbott NATIONAL ELECTRICAL CODE HANDBOOK, \$3.00 postpaid, for 10 days' free examination. I will return the book postpaid in 10 days or remit for it then.

Name

Address

City and State.....

Occupation

Company

E.C.8-32

73 SALES OPPORTUNITIES FOR ELECTRICAL CONTRACTORS

tear out
and mail
now

Check on reverse side the
items in which you are
interested and complete in-
formation will be sent you.

First Class
Permit No. 717
(Sec. 384½ P. L. & R.)
Chicago, Ill.

BUSINESS REPLY CARD
No postage stamp necessary if mailed in the United States

2c-POSTAGE WILL BE PAID BY—

ELECTRICAL CONTRACTING

520 No. Michigan Ave.

Chicago, Ill.



These items can be sold NOW

On the following pages—73 sales opportunities for electrical contractors are outlined.

The products or sales helps described touch residential, industrial and commercial customers. Some items are distinctly specialties while others feature economies.

It should be obvious after a digest of these items, first, that there are many, many opportunities to make sales and secondly, that the manufacturers can be counted on to supply all kinds of good sales helps.

Each item in this section has been given a number. On the postcard below check the numbers on which you wish further information. Tear out the card and mail it to ELECTRICAL CONTRACTING. No stamp is necessary.

Electrical Contracting, Chicago, Ill.

Please send me, without obligation, complete information about the items checked below.

- | | | | | | | | | |
|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1. <input type="checkbox"/> | 10. <input type="checkbox"/> | 19. <input type="checkbox"/> | 28. <input type="checkbox"/> | 37. <input type="checkbox"/> | 46. <input type="checkbox"/> | 55. <input type="checkbox"/> | 64. <input type="checkbox"/> | 73. <input type="checkbox"/> |
| 2. <input type="checkbox"/> | 11. <input type="checkbox"/> | 20. <input type="checkbox"/> | 29. <input type="checkbox"/> | 38. <input type="checkbox"/> | 47. <input type="checkbox"/> | 56. <input type="checkbox"/> | 65. <input type="checkbox"/> | |
| 3. <input type="checkbox"/> | 12. <input type="checkbox"/> | 21. <input type="checkbox"/> | 30. <input type="checkbox"/> | 39. <input type="checkbox"/> | 48. <input type="checkbox"/> | 57. <input type="checkbox"/> | 66. <input type="checkbox"/> | |
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Name _____

Street and Number..... City..... State.....

Company

**check the items
in which you are
interested
and mail the
post card now**

73 SALES OPPORTUNITIES



1. Air Conditioning

Air conditioning offers one of the biggest sales opportunities today of any new product. It is now starting and contractors can now get in on the ground floor. One manufacturer has recently brought out a unit that delivers over 9,000 cu. ft. of conditioned air per hour, that washes, scents or disinfects as desired, that is portable and plugs into any outlet and is housed in metal cabinet 18 in. by 15 in. on the floor and of table height. This unit provides a cooling system in the summer and by humidifying the air in the winter cuts down the fuel bill.

2. Selling Plan for Sound Equipment

After careful study of the needs of electrical contractors one manufacturer has formulated a new plan for selling sound equipment. Such features as exclusive territories and cooperative advertising are provided. A manual describing this plan is available.



3. Fixture for Hazardous Locations

Explosion-proof lighting fixture conduit fittings are intended for use in hazardous locations where with ordinary lighting fixtures a broken lamp or a

ground or short circuit in the receptacle or wires might cause an explosion.

The walls, glass globe, and fastening means have sufficient strength to withstand any internal explosion and the joints are tight enough to prevent escape of flame. Openings between lamp and wiring compartments, around or through the lamp receptacle, are completely sealed. Wire terminals are covered by the sealing compound to a depth of at least $\frac{1}{8}$ in., but pigtail leads provide for connection to the circuit wires. An explosion in either compartment cannot be communicated to the other. The globe is protected against accidental breakage by a very rigid cast metal guard which also serves to clamp the globe firmly to the hood of the fixture.

4. Two Station Phone

A new two-station telephone set boxed, with complete instructions, in an attractive display carton with 40 ft. of 3-conductor wire and a quantity of insulated staples provides a sales opportunity for contractors in stores, homes, offices and innumerable places where an inexpensive but reliable inter-communicating system is desired. All mechanism is mounted on a solid recessed moulded block and with reasonable usage should give service for many years. The phones are finished in green lacquer with red bakelite bottom. They are suitable for use up to 4,000 ft. apart.



5. Oil Burner Transformer

A new oil burner transformer has recently been announced in which the design has given consideration to the fact the cellar is now a play room for the grownups with the result that the corners and edges of the new streamline case are gracefully rounded, adding greatly to the appearance of any installation. The case is also rustproof for longer life. A large junction box is incorporated to accommodate filter condensers and wiring. A choice is offered of standard or shockproof porcelain insulators enclosing all high voltage parts. And radio interference has been practically eliminated.

6. Ventilation Installation Manual

In order to assist the contractor in planning, estimating and installing ventilating systems, a well-known manufacturer of ventilating equipment has prepared a manual giving this information. This book contains data on how to plan and estimate ventilating systems, air volumes required, location of outlets, sizes of ducts, gauges of metal for duct work and discussions of various applications of ventilating equipment. This ventilation guide has endeavored to present the few basic principles in such a way that the contractor will feel competent to handle practically any problem in ventilating he may encounter.



7. Health Lamp

A new and different type of health lamp has been designed to fit into any lighting socket without requiring transformers or other additional apparatus. It replaces any incandescent bulb and operates without noise or dirt. The lamps are made in 60, 100, 150 and 300 watt sizes.

8. Shallow Type Safety Panel

A line of shallow safety panelboards is now available that employs cabinets only 6 in. deep and 19 in. wide which can be supplied for flush or surface mounting. The flush mounted cabinets have trims equipped with self-adjusting trim clamps. Surface mounted cabinets are supplied complete with hinged gutter covers and door. Trims, cabinets, and interiors can be shipped separately.

One of the main features of the new line is the fact that combination panels can be built up for such applications as service stations where a combination power and lighting panelboard conserves space and reduces installation costs.

The new panelboard offers several refinements such as test holes in the door for fuse tests, swivel blade holders which permit locking the circuit on or off, and flush type door locks and latches.

HEMCO QUALITY DEVICES at POPULAR PRICES.



The enlarged Hemco line now includes over one hundred wiring devices and accessories, for which there is a constant demand for replacements, new construction and improvements.

Here is high quality merchandise, at 1932 prices, that Electrical Contractors can install with every assurance that satisfied repeat customers will justify the use of faultless devices.

There is no substitute for high quality. Why waste sales effort and installation time on inferior, sub-standard devices, when widely known Trade Marked products of proven worth are available on a competitive price basis.

Hemco and Bryant registered trade marks stand now as always for the best in design, materials, workmanship and appearance.

All devices listed as standard by Underwriters' Laboratories.

THOSE WHO KNOW DEMAND HEMCO

Send for Hemco Bulletin No. 7

BRYANT SUPERIOR WIRING DEVICES

Manufactured by THE BRYANT ELECTRIC CO., BRIDGEPORT, CONN.

MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888—MANUFACTURERS OF HEMCO PRODUCTS

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SOLE SELLING AGENT

JM Johns-Manville
292 Madison Avenue, New York City

What you want to know

**ABOUT
UNDERGROUND
CONDUIT**

How to keep installation costs down
How to reduce maintenance expense
How to avoid out-of-line layings
How to insure tight joints
How to reduce possibility of electrolytic damage . . .

THIS BOOK answers these pertinent and important questions for you. It is written to help every man who buys or uses electric cable for underground installation and who wants to know how to reduce the cost of protecting it.

We've had 39 years' experience making Orangeburg Fibre Conduit — the accepted standard underground conduit . . . 39 years of working in closest co-operation with those engineers and public utility companies who have led in developing underground electric systems. What we've learned by working with the man on the job is in this book. Send for your copy. It may help you avoid unnecessary cost and needless maintenance expense.

**The Fibre Conduit
Company
ORANGEBURG, N. Y.**



9. Stainless Steel Ventilating Fan

To match the fixtures in kitchens where a monel metal or stainless steel sink is used an 8-in. ventilating unit is now available with outside face and door of stainless steel. This unit, which may be had in buff or cream enamel when desired, can be installed in the smallest of kitchenettes. A hole 13-in. square is made in the wall, a 1-in. frame is installed and the unit fits snugly in the 11-in. opening.

claimed because there is only one winding which is used for both the primary and secondary has been on the market a short time.

Since the primary and secondary are interconnected, these auto transformers are small in size. They are generally applied, where local conditions permit, to obtain 115 volt lighting current from a 230 volt a. c. circuit.

They are also very satisfactorily used with portable tools and appliances where it is necessary to obtain a change in voltage.

moved, places where building rules and city ordinances prohibit the blowing of foul air into alleys and streets, and in rooms or buildings that are without windows, a manufacturer offers a utility blower with capacities from 50 to 10,000 cu. ft. of air per minute, complete with direct attached motor for all usual electrical currents. Blower is equipped with low speed multiblade type wheel consisting of a large number of curved narrow blades pitched forward in the direction of rotation.



10. Clock Outlet

A new device which provides an outlet and support for electric clocks has been placed on the market which can be used on every wiring job. The attachment plug receptacle is below the surface and wiring is concealed so that the clock hangs flat and presents a neat appearance. Receptacle is porcelain, the plate is molded bakelite and the support is sufficiently rugged to meet all requirements. This device should be easy to sell and install as most homes now have electric clocks.



13. Sound Equipment

A new "package" type all purpose sound amplifier has just been announced which opens a tremendous market to electrical contractors. A complete sound system can be quickly formed by connecting a microphone, radio, or other input to a Model 17 amplifier and connecting the output to the necessary loud speakers. Installations for auditoriums, hotels, hospitals, schools, and many other applications may be made with this simplified equipment.

11. Flood Lighting Sales Manual

A floodlighting sales manual, while designed primarily to show central stations the value of this load, can be profitably used by contractors because it analyzes all of the applications of floodlighting as to prospects and sales appeal. The manufacturer concludes the manual with a tabulation of sales promotion material available for each of the different applications.



12. Auto Transformer

Reducing maintenance costs is the important task of the electrical contractor today, and many profitable installations can be made by having proper information available so that correct recommendations can be made. In many industrial plants, two separate circuits are maintained; one for power service and the other for lighting. This necessitates two separate rates and meters. By installing transformers the lighting circuit can be interlocked, allowing the lighting service to be obtained at the power rate.

An air-cooled auto transformer for which an economical installation is

14. Range Replacement Units

With four standard assemblies, plus interchangeable outside adaptor rings it is now possible to replace any range unit without a heavy stock investment. These replacement units are designed to speed up electric cooking. A plan book showing six simple steps in selling this unit is now available. It is based upon actual experience. Other sales help available to the contractor upon request are: Letters, folders, flashing electric display, 3-color window trim and newspaper advertisements, mats or steros.



15. Utility Blower

For use wherever a duct system is advisable or necessary, such as basements in large buildings where fresh air must be distributed evenly and impure air re-

16. Door Chime

A new door chime that is used with present door bell wiring and push buttons and is low in price has recently come on the market. The chime comes in single notes for one door or double note for both front and back door signals. A free display board is available. The only change in wiring is the substitution of a special transformer which is provided with each chime. Every wired home is a market.

17. Push Button Gas Control

Gas bills for hot-water heating can be cut in two by means of an electric push button control. This system which requires a contractor to install it, is now being sold by contractors in homes ranging in value from \$5,000 to \$15,000. The switch plates come in nickel or enamel finish and are provided with bulb's eyes to show when the gas is on. The system includes a safety thermostat to prevent the heating of more water than needed and also a safety electric valve to shut off the gas when the current fails. Current for the system is taken off the bell transformer. This is an excellent specialty for the contractor to offer to customers for whom he has previously worked.



18. Friction Tape

Contractors servicing industrial plants that have their own maintenance men will find many opportunities to sell them their small supplies. One such item is a new large shop package of friction tape. By this new method of packing 10 rolls are wrapped in parchment disc separators between rolls and enclosed in a large carton. The savings in tinfoil, individual cartons and labor make for lower prices than those for individually wrapped rolls.

19. Fixture Hanger

Two new hangers designed for use with socket type semi-indirect reflector units are now being offered in response to a demand for suspensions to harmonize with the reflectors for relighting jobs where the old equipment proves unsuitable for carrying the units. The fixtures are of two types—semi-rigid stem suspension and cord suspension. They are designed to support any of the three commercial reflectors which severally accommodate lamps from 100 to 500 watts. The standard finish is the same matt aluminum as the reflectors.

tact or a positive disconnection. Being a general duty switch, it is also adaptable to control a number of lighting circuits.

22. Specialty Lighting Equipment

A complete line of show-case, store, bank, theater, art gallery, hospital, school, church and public building lighting equipment is being offered contractors as an immediate market opportunity. This line is completely described and illustrated in a 72-page booklet.



20. Small Telephone Set

There is a wide market in larger homes and in smaller business establishments and institutions for small interior telephone systems that can be met with a newly developed automatic telephone. It has hand-type instruments and a dial station-selector, which takes the place of push buttons found in many intercoms; is a compact, reliable device, convenient to use and needing virtually no maintenance. This set serves up to ten lines, permits five conversations at a time and is very simple and sturdy. It is easy to install and can be handled successfully by contractors on a merchandising basis.



23. Code Call

An automatic paging and code signaling systems at low cost for stores, offices, industrial plants, hotels, institutions, etc., provides a new market for the contractor.

It may be visualized as a self-operating mechanical push button with a capacity of 30 different and distinct code signals. It operates on any current supply and controls any number or combination of signals such as bells, buzzers, horns, etc. Heavy duty tungsten contacts carry a load of 100 watts, 7½ amp., without the use of a relay.



25. Explosion Proof Fittings

Explosion proof fittings provide a modernizing opportunity for the contractor. In places where there is any explosive atmospheric condition due to dust or fumes, explosion proof fittings should be substituted for the older variety. These fittings which have only just become available are now required on all new work where there is a hazardous condition.

These fittings are now made in complete lines including interlocked explosion proof receptacle plug and switch (shown above), explosion proof switch, junction boxes, sealing fittings, unions, conduit fittings. Complete details are now available.



21. Low Priced Switch

To meet the demand of present business conditions for low priced equipment a 2 h.p. manually operated switch of high quality has just come on the market. It is rated at 30-amp, having 2 poles, 2 blades and 2 fuses with blades of the double butt wiping contact design, similar to contacts in the manufacturer's much higher priced magnetic switches. The new switch carries a 2 h.p. rating at either 230 volts a. c., or 250 volts d. c., and is particularly adapted for use on small motor driven machines with automatic apparatus such as oil burners and ice machines either for con-



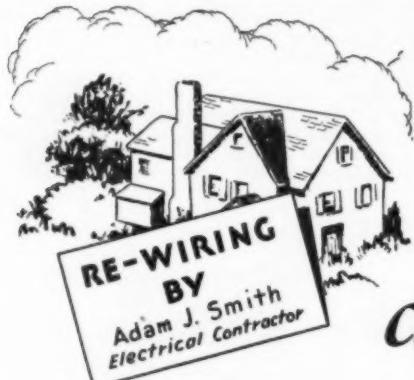
24. Ventilating Fan

A ventilating fan designed to have a fine appearance, high efficiency and quiet operation, as well as being light in weight and, therefore, easy to install is finding, the manufacturers state, exceptional uses in restaurants, lodge rooms, small stores, specialty shops, etc., where it is necessary to obtain frequent air changes and expel cooking or other odors from a room. The fan was not



26. Porcelain Fixture Display

An attractive means of effectively presenting porcelain lighting fixtures is here illustrated. Finished in silver and black—each section properly dimensioned so that individual distinctiveness is given each fixture—this display board quickly commands attention. This display is presented by the manufacturer with the purchase of only the fixtures shown.

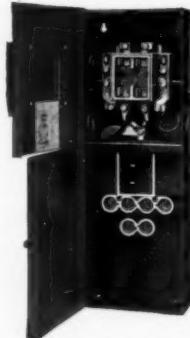


"Let's modernize our home... we can't build a new one"

—that is the sentiment all over the country... a condition of unparalleled opportunities for electrical contractors...it starts the business-building program—**EXTENSION WIRING!**

AN unprecedented activity in the industry is under way—**EXTENSION WIRING**—an activity that grew out of the so-called "depression." No new building—therefore, no new business for electrical contractors, who have been wondering "what it's all about."

But—right under your noses exists a million dollar market in the electrical



No. 6636 RL6

The simplified service requirements of the 1931 Code are built into the new Colt-Noark meter service switches giving greater wiring economy.

modernization of old homes, schools, institutions, offices, and industrial plants. They will not spend a dollar for new or additional building, but they are awake to the need of more adequate wiring to provide for today's electrical needs.

Extended circuits call for new switches. Your wholesaler stocks the complete COLT-NOARK line, with which you can meet every need calling for meter service or industrial type switches.

COLT'S PATENT FIRE ARMS MANUFACTURING CO.

PIONEERS OF PROTECTION SINCE 1836

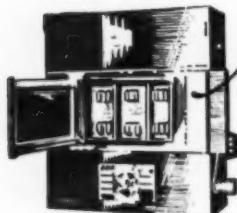
ELECTRICAL DIVISION HARTFORD, CONN.

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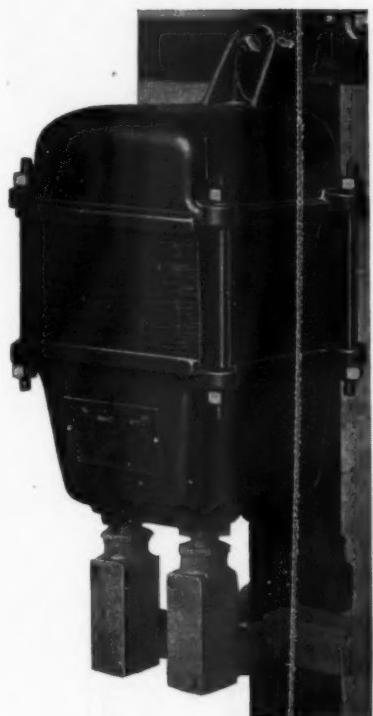
EW-2-32

New circuits mean...

NEW SWITCHES



Another Profitable Wagner Line —— AIR-COOLED TRANSFORMERS



Nearly every industrial plant has small compressors, drills, and other small motor-driven machinery, soldering irons, glue pots, and other heating appliances, which require a power voltage lower than that supplied by the plant's power circuit. To connect such low-voltage machinery to the lighting circuit is costly, for these are not lighting loads. They are *power* loads, and should be connected to the power circuit.

By installing Wagner air-cooled transformers, power loads can be connected to low-voltage power circuits, irrespective of voltage requirements or location of machines and appliances.

Because of fire hazard and Underwriters' regulations, the ordinary oil-filled transformers cannot be installed inside buildings. Wagner air-cooled transformers solve this problem, and thereby enable electrical contractors to reduce their clients' electric power bills.

Write for Part 4B of Wagner Bulletin 172 describing Wagner air-cooled transformers; investigate the profit-making possibilities of Wagner air-cooled transformers.

Wagner Electric

MOTORS • TRANSFORMERS • FANS • BRAKES

Wagner Electric Corporation,
6413 Plymouth Ave., St. Louis, Mo.

Gentlemen:

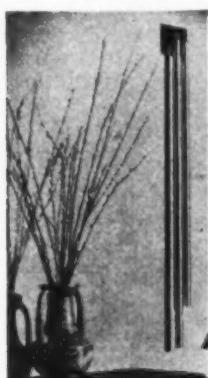
Please send me a copy of your bulletin 172, Part 4B, describing Wagner air-cooled transformers, and have your nearest branch office quote prices and discounts.

Name _____
and Position _____

Firm _____

Address _____

T332-3A



27. Door Chime

One of the modern influences in homes is the electric door chime. This one features perfectly tuned chimes which can never get out of tune. These chimes are hand burnished and lacquered, made of special bell metal, and provided with means for regulating volume and tuning. Units come in two, three or more notes as desired. Descriptive booklets are available as well as portable demonstrating kits and a display panel equipped with a set of chimes.

28. Radio Noise Eliminator

A new device is to be put on the market shortly designed to remedy the greatest of all complaints of the radio broadcast listener—noise.

It can be easily attached to any aerial. Used in conjunction with a shielded lead-in wire, it provides maximum radio pickup to the set with minimum loss and at the same time, with a shielded download, eliminates the pickup of extraneous noise.



29. Quiet Ventilating Fan

A great deal of thought is being given at this time to the ventilating of rooms, stores, restaurants, etc., or exhausting odors from kitchens, gases from garages, steam and fumes from pickling vats, paint spray booths, etc. Therefore, a manufacturer is offering to contractors a fan designed to deliver its maximum capacity when operating at low speeds to insure quiet operation. The fan wheel is constructed of ten overlapping blades and is mounted directly

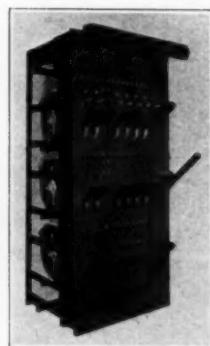
on the electric motor shaft. Capacities from 600 to 1,800 cu. ft. of air per minute.

30. Poster Service

A complete line of sales helps available for the use of dealers, including envelope inserts, catalog sections, newspaper cut sheets which in addition to an assortment of newspaper cuts gives several layout and copy suggestions, and a complete window display service, as well as a poster service which is growing more popular every day, has been developed by a national distributor. Briefly the poster service is this: Every dealer signing up on the poster plan will secure free of charge each month a colorful, attractive advertising poster, featuring products he is selling. Also a neat weatherproof frame will be furnished for each outside poster space and a wood frame for indoor spaces. These posters will (1) help him sell more electrical appliances and radios, (2) help to make more attractive his trucks and store, and (3) identify him as an outlet for this distributor's products in particular and electrical appliances in general.

the modern type of motor starter, which is used in all large industrial plants. Automatic motor control is not expensive and it gives overload protection to the motor and convenient push button operation.

Feeling that contractors had dodged sales of automatic motor control because they were afraid they did not have sufficient technical knowledge for the proper application, one manufacturer has published a condensed price catalog simplifying the problem of control selection.



33. Small Stage Equipment

Small stages in schools, lodges, churches and elsewhere can now have professional lighting effects through a small switchboard specially designed for that purpose, having all of the characteristics of the large type of board in a compact form. A complete line of stage lighting equipment is available from the same manufacturer.



31. Color Flood

A color floodlight at a low cost even considering today's prices opens up an opportunity to do business with small stores. This unit can be used for window display or as a color spot to focus attention on some single item inside the store.



32. Automatic Starters

The electrical contractors have many opportunities for selling automatic starters with push button operation. This is



34. Short Interval Time Switch

A short interval, low-priced time switch for appliance control or for automatically turning off current in places where it is so easy to forget and leave it on, such as cellars and closets, is available. It is particularly adapted to sun lamps as a protection against sunburn. For devices operating for a long time, a long interval switch is now being made by the same manufacturers and like the other is available, either for wall mounting or portable use when refrigerator, radio or any other device is to be controlled.

35. Electric Eye

The photo electric relay provides a new type of control for industrial application that is beginning to show unusual economies. The unit is also applicable to light control in schools, commercial buildings and factories, floodlights, signs, window lighting, etc. This market is now just opening up and as such provides exceptional opportunity for a contractor wanting to specialize. Now is the time to get in on the ground floor of a market that is bound to be tremendous. Bulletins of instructions, applications and description of devices are available.



36. Manual Push Button Switch

A hand-operated push button switch of low price has been placed on the market which the contractor can sell in modernizing plants. The switch is mechanically operated, not electrically operated, yet it looks like an electrically operated switch. It provides complete overload protection, but not no-voltage release.

37. Wiring Sales Plan

One of the leading wiring device manufacturers has developed a practical plan for helping the contractor especially to sell additional and modernizing wiring. The plan includes a display board with six specialized use devices and an 8-page booklet illustrating and describing and suggesting uses for all of the latest developments in the wiring device field. Contractors who have put this plan into use have been well rewarded.

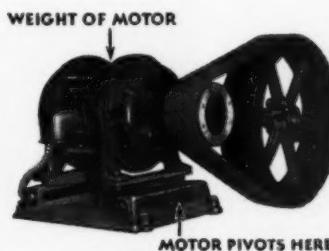


38. Lighting Strip

The new lighting strip with fittings, provides a simple, neat, practical and economical method for installing an unlimited number of lamps on any centers—from 3-in. up. The lighting strip may be wired and assembled in the shop before being taken to the job. The new method may be utilized to good advantage in window and store lighting—and in the new cove, built-in and luminous box lighting.

39. Adequate Wiring

Residential construction has already started to gain. These new houses want the best in modern living conveniences. This is possible only with adequate wiring. A complete sales folder showing what adequate wiring is, how to sell it and how to tie in with national advertising is available.



40. Motor Drive

An opportunity for additional sales for the electrical contractor today is the short center flat belt drive, which can be installed so as to drive one or more machines from the motor. The contractor can become a specialist in the complete installation, selling or overhauling the motor, wiring for the motor and control and selling and installing this drive. It insures dependable trouble-free operation with uniform speed and transmitting capacity.

refrigerator display cases. In anticipation of the demand for a neat and attractive lighting unit universally applicable to the exterior of popular models of refrigerator display cases, a refrigerator-light has been developed that is tailor-made to fit the case and is regularly finished in white porcelain enamel with polished aluminum fittings. The sockets may be specified on 12 in. or 18 in. centers and the standard 25-watt T-6½ intermediate screw base tubular mazda lamp is used in this unit.



43. Free Mailings

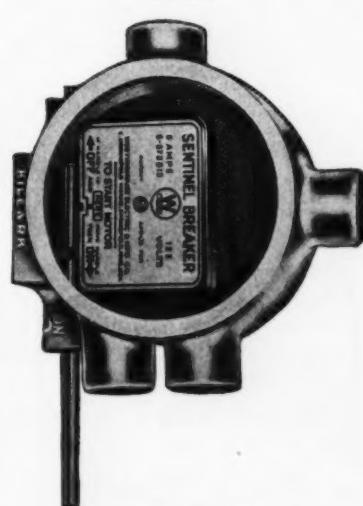
A manufacturer of a line of ventilating fans has developed a mailing piece for contractors which will be furnished free or, if the contractor will send the manufacturer his list of prospects, the mailing, including postage, will be done at no expense to the contractor. In addition, this manufacturer has just issued a new 16-page fan catalog which will be furnished in any quantity to contractors who will agree to distribute them among their customers and prospects.



41. Aluminum Bracket

An aluminum bracket, designed to take a choice of lighting equipment, may be used for farm yards or club entrances, wayside signs or apartment areaways, building entrances or garage lights, in fact, anywhere outside or inside.

The one piece aluminum casting replaces the ordinary assembly of wall flange, conduit stem and socket fitting. It is drilled for support by screws and threaded at back and bottom for ½-in. conduit.



44. Explosion Proof Fittings

A new line of explosion resisting conduit fittings for use around gasoline filling stations and other hazardous locations is about to come on the market. They are made with screw covers and also rectangular shapes with heavy ribbed cover held in place with four screws. One of the fittings is designed to hold a circuit breaker. It is 4½ in. in diameter. A rod operates the breaker where it is used as a switch.

42. Refrigerator Case Lighting

One of the most potential opportunities for increased merchandise sales today lies in the development of refrigerator display case lighting business. The cream of this business is now at hand and unlimited profits await the contractor who goes after it. Everywhere meat markets, food marts, grocery stores, etc., are lighting up their



45. Time Switch

Electrically operated time switches have a multitude of uses, such as in the field of sign lighting, apartment house lighting, window lighting control. To enable the contractor to sell this market a nationally known manufacturer has developed a moderately priced dependable switch in two types. One is synchronous motor operated for use on regulated circuits and the other is driven from a motor wound spring. Both switches employ the new, slow-acting small opening type of contact which permits a rating of 40 amp.

46. Friction Tape Display

Sixteen 2-oz. rolls are contained in each black and yellow carton, each roll being wrapped and sealed in protective cellophane. The lid of the carton (when open) is cut to display a large roll of tape. This combination of boxes and carton makes a display that catches the customer's eye and helps materially to sell more tape. A display carton containing 32 one oz. rolls is also available.



47. Display Case Lighting

Every drug, hardware and department store and, in fact, practically all merchants are prospects for detachable display case lighting. Few stores have show cases and wall cases that are improperly lighted or perhaps not illuminated at all. These are the prospects.

The great advantage of this particular unit is that it is quickly and completely

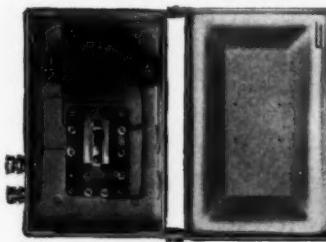
removable to permit thorough cleaning of case or the renewing of lamps.



48. Surface Extension Wiring

Surface extension wiring with non metallic materials is now approved in the Code. This new product, devised for installation under the new rules to take the place of lamp cord wiring, comes in three colors to match the woodwork—white, ivory and oak. A stapling machine has been developed to insure a substantially firm and neat job with minimum amount of labor. The manufacturers also have a stripper that will cut the assembly at any point for the placement of outlets and bare the wires but not cut the conductors. The system comes complete with outlets, ends and corner fittings.

ture in the home in winter, and will heat water for domestic use the year round, without manual supervision. The new furnace is suitable for application to both steam and hot water heating systems. For application to warm air systems the new furnace is supplemented by an air conditioner.



51. Remote Control Relay

A manufacturer has announced a remote-control relay set, including transformer, which has a multitude of uses from thermostatic control of industrial heating processes to remote control of radio in the home. By the use of this set it is possible to control 110-volt apparatus through a run of lower voltage wiring and an inexpensive toggle switch thereby promoting an inexpensive installation with approved material. The set is rated for $\frac{1}{4}$ h.p. or 6 amp. 110 volts, a.c.

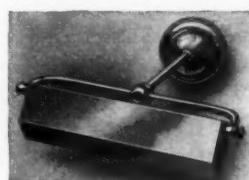


49. Bathroom Cabinet

Sliding light bathroom cabinets are good sales items where building construction is off. While continuous sales are possible in residences, the larger market is in apartments and hotels. Here the contractor can point out that a modern bath is the strongest of rental or sales features, and that while other modern improvements and innovations are relatively expensive, these cabinets dress up a whole bathroom at very low cost. This creates jobs and adds to the profit of an ordinary wiring job. Manufactured and distributed by five leading cabinet makers under license, all Underwriter approved.

52. Remote Control Switch

Anything which will save in current consumption and reduce the cost of installation can be sold. Remote control switches for flood, window and sign lighting circuits and for the lighting of auditoriums, parks, stadiums, railway yards, theaters, and all kinds of public buildings bring these economies. Wiring plans, a variety of applications and engineering assistance are available upon request.



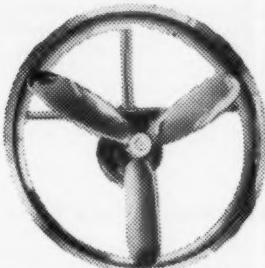
53. Store Brackets

Practically all merchants are prospects for this new style of bracket light, which is used for fitting rooms and wall displays, or for display and wall cases where inside lighting is not desirable.

The following are the new features and selling-aids: special housing and reflector design producing more and better distribution of light, and decidedly cooler units. A fork construction that permits any desired adjustment necessary.

50. Oil Burner

A revolutionary principle of combustion is employed in the new oil furnace for homes which has recently been announced. Economy of operation, safety, quietness, and its fully automatic operation are the outstanding advantages. The furnace comprises a coördinated boiler, burner, and control, designed and manufactured as one unit. It will automatically maintain an even tempera-



54. Aluminum Ventilating Fan

Built entirely of aluminum this fan offers the following sales features: Nothing to rust or corrode, quiet operation, no vibration, light weight and, therefore easy to install, easy to clean, maximum volume air delivery with minimum power consumption, low initial cost per cubic foot air capacity. This unit is equipped with a specially designed 3-speed motor and has the cup-shaped ring feature to prevent back pressure.

55. Industrial Electric Heat

Industrial electric heat offers an unlimited field for the industrial electrical contractor. The big applications such as furnaces are sufficiently special as a rule to invite the attention of a factory specialist. The small applications, on the other hand, should present the contractor with a profitable sales opportunity.

To help him in this work one manufacturer has recently provided a condensed catalog which in effect gives the answers to hundreds of small industrial heat problems.

56. Burglary Protection

Protection against kidnaping and burglary by means of low cost floodlights or angle reflectors can be sold to the public. A booklet giving diagrams and suggestions is available.

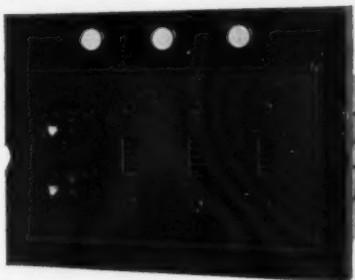


57. Fuse Clips

While it might in many instances be impossible to make a large sale to industrial or commercial customers, in almost every instance there are many recommendations that a contractor might make which would mean a small sale, the aggregate of which would be worth while. One such idea might be the recommendation of fuse clips. It is claimed for them that they insure 100 per cent contact, prevent heating and burning of fuses, save on current and fuses, eliminate clip replacement, unnecessary shutdown, arcing at contacts, and heating of wires and cables.

58. Renewable Fuse

The primary sales appeal of this renewable fuse is its simplicity—only three parts and no tools needed to put it together. Its second talking point is unlimited years of service, having been designed to stand repeated blow-outs. The fuse has brass to brass contacts and a new method of venting direct through the end caps thereby producing cool operation in the fuse chamber.



62. Flush Call Demonstrator

To show home owners the advantage of flush calling devices a demonstration outfit is offered at cost. It consists of 110 volt receptacle, transformer, bells and buzzer for front door, rear door and dining room exactly as the finished job would be arranged. The plate has snap fasteners so it may be easily removed to show the devices in operation. Simply plug into the receptacle and three pushes will operate the different calls.



60. Ball Bearing Motor

A manufacturer of ball bearing motors has prepared literature pointing out ways to compare motor values. This manufacturer has developed data to show how its ball bearing motors will reduce power costs in maintenance expense. Leaflets with facts are available to help the contractor in selling through industrial plants.



63. Low Voltage Circuit Breakers

Fuseless circuit protection made possible by a new design of industrial circuit breaker for low voltage circuits offers a new source of business to the contractor. With this equipment it is no longer necessary to have a maintenance man to renew blown fuses; the machine operator can restore service merely by flipping a handle. This means considerable economy in production expense by the elimination of lost time. These breakers cannot be bridged or changed by unauthorized persons.



61. Floodlight

A practical means of lighting outdoor areas for sports or for work is provided by this open type floodlight with focusing beam projector. The outer reflector is porcelain enameled green outside, white inside and serves as a protecting hood for the lamp as well as a light diffuser. It has a rectangular opening 16x18 in. and is equipped with cadmium plated mogul socket fitting.

64. Air Cooled Transformer

Air-cooled transformers are an article of real merit for contractors to sell, especially so now, because they will effect many economies and savings for both the customer and the contractor.

One of the savings that can be effected for industrial and commercial customers, is to use them to supply 110-volt for lighting from 220, 440 or 550-volt, a. c. power circuits, which enables the customer to buy lighting current at the power rate. Most public utilities are willing to give this advantage in rate as it saves them the cost of maintaining

more than one service, meter reading, etc.

Data showing actual savings to the customer are available upon application.

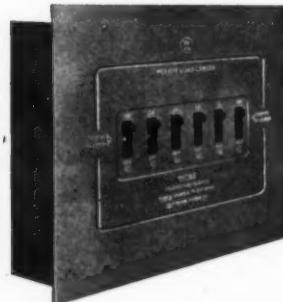
65. Show Case Reflector

This new reflector, designed especially for show case work, is made of steel having a reflecting surface of polished chromium plate and finished a sprayed statuary bronze outside. It comes equipped with a porcelain socket for 25-watt T-10 tubular lamp and hangers for either wood moulding or all glass case.



66. Shadowless Fixture

The new shadowless indirect fixture is a modern decorative unit for commercial and institutional use. It provides a soft, well-diffused light without shadows or glare. The fixture is attractively finished outside in antique ivory and acid-etched aluminum, a finish which blends well with the interior decoration of any room. The reflector has white porcelain enameled steel reflecting surfaces.



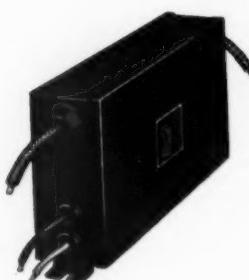
67. Residential Circuit Breaker

The safety, convenience and economy of the new circuit breaker load center for the home can be sold both in rewiring and new work. It is tinker-proof

which means that the circuit and appliances are always protected. If something is wrong with circuit or appliance it must be corrected before breaker can be reset. It is convenient because there are no fuses to replace, just a flip of the handle and current is restored. It is economical because it reduces wiring costs.

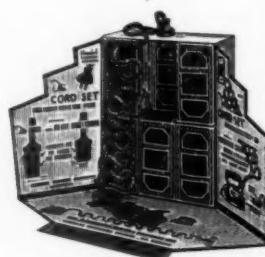
68. House Number

Illuminated house-numbers that make addresses as readable by night as by day are being used by a large number of home owners and because of the reasonable cost to install, is one of the popular items that contractors can sell. These illuminated house-numbers are simply designed, yet beautiful and inexpensive, and give a very bright light.



69. Thin Model Sign Transformer

A thin model gaseous tube sign transformer has just been announced, designed especially for use where installation space is at a premium. The model shown is only 2 1/4 in. wide. Internally, the design of these thin models follows the same principles, offering the same dependability and long life as other styles of gaseous tube transformers by the same manufacturer.



70. Self Folding Cord Set

A cord set that is guaranteed for one year, that has a self-folding cord thereby keeping the cord out of the way, especially when ironing, equipped with a screwless bakelite heater plug and an

unbreakable live rubber cap with a handle grip should offer a sales opportunity to contractors. The sets come with switch or switchless plug, 12 to a carton which is a combination shipping unit and counter display.

71. Refrigerator Case Reflector

A reflector designed for refrigerator case illumination, made of brass with a reflecting surface of polished chromium plate and finished outside chromium plate, equipped with socket for 25-watt T-10 tubular lamp.

Simplicity and neatness characterizes the reflector's appearance and sets off the case effectively.



72. Time Lag Fuse

Because of its time-lag this fuse holds many a harmless overload that would make other fuses blow; yet it blows promptly on dangerous overloads and short circuits. The story of this time-lag has been published in a handy pocket size booklet that is filled with sales information. It tells of the need that existed for a fuse with a super time-lag. Shows how these fuses offer improved protection against dangerous overloads and short circuits and, at the same time, enable users to eliminate many of the needless shut-downs caused by fuses blowing on harmless overloads—shut-downs which have hitherto been the greatest cost of electrical protection.



73. Portable Floodlight

For short-range, general floodlighting, these portable floodlights are available in three sizes accommodating 75 to 100 watt inside frost lamps. They are easily mounted anywhere—in the ground, on roofs, on pipe brackets or poles, on building walls, etc. Each unit is equipped with a removable cast spike for ground mounting. Completely adjustable to any angle, horizontally and vertically, they are especially adapted for floodlighting signs, driveways, roadside signs, small buildings and yards.



1/6 Horse Power Century Type RS Repulsion Start Induction Single Phase Motor.

This Means a Lot to Motor Users

Century Electric Company started in business in 1903. That in itself means nothing. But, *this* means a lot:

The first motors that ever went out under the Century trade mark "Kept a-Running," simply because they were *built right*—right from the start. They have always been so right that they have been actually responsible for many advancements in the electrical industry.

For instance, they played a most prominent part in popularizing the use of motorized equipment when lighting circuits were the only available source of power . . . Again, when the Electrical Refrigerator and Oil Burner Industries were in their infancy, *their motor problems had already been solved by Century*—not with a specially built motor, but with a motor *already* so right that it met every exacting service requirement.

Many other similar instances could be cited to indicate Century's leading place in the picture of industrial development during the last 28 years. It points definitely to one thing:

No matter what your requirements are, you will profit by an investigation of Century Motors.

Century
MOTORS

CENTURY ELECTRIC COMPANY, 1806 PINE ST., ST. LOUIS, MO.
Offices and Stock Points in Principal Cities

ALTERNATING AND DIRECT CURRENT, SINGLE PHASE, POLYPHASE, SPLIT PHASE, MULTISPEED
AND SPECIAL MOTORS, RANGING IN SIZE—DEPENDING ON TYPE—FROM 1/60 TO 250 H. P.

83-91/6

FOR MORE THAN 28 YEARS AT ST. LOUIS



**SX
SHEATHED CABLE**

Nobody
can tell you
truthfully
that there are
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Specify Alphaduct and
SX to your jobbers
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A typical advertisement in the Westinghouse National Advertising Campaign on Fuseless Protection.

CIRCUIT Protection that keeps PRODUCTION in step with THE TIME CLOCK

A FUSE blows in your plant . . . production stops . . . men and machines stand idle—waiting for the shop electrician to restore service. But the time clock ticks steadily on—production costs pile up. The expenses incident to fuse replacement do not appear on the debit side of your ledger . . . but they're all there nevertheless. And it's a bill you needn't pay!

Westinghouse "De-ion" Circuit Breakers eliminate fused switches for motor circuit protection once and for all. When a dangerous overload breaks the flow of power, a flip of the breaker handle restores service immediately. There's no delay . . . and you can do it safely and inexpensively.

INDUSTRIALS are learning about Fuseless Protection ▪ ▪ ▪

HOW the new Westinghouse "De-ion" Industrial Circuit Breaker helps eliminate production delays in industrial plants is the story told by a series of advertisements now reaching thousands of plant superintendents. Business magazines with circulations totalling over 50,000 are carrying this message to buyers right in your neighborhood.

The new economies assured by this new idea in inexpensive circuit protection have gained wide interest, and to you they offer new and

effective sales appeal in going after business.

Blown fuses and the expense incident to their replacement are now unnecessary. The "De-ion" circuit breaker opens on dangerous overload to protect the circuit. Then when the overload has passed, a flip of the breaker handle restores service instantly. Anyone can operate it.

Be ready to meet the demands of your industrial customers. Familiarize yourself with Fuseless Protection. Simply mail the coupon.

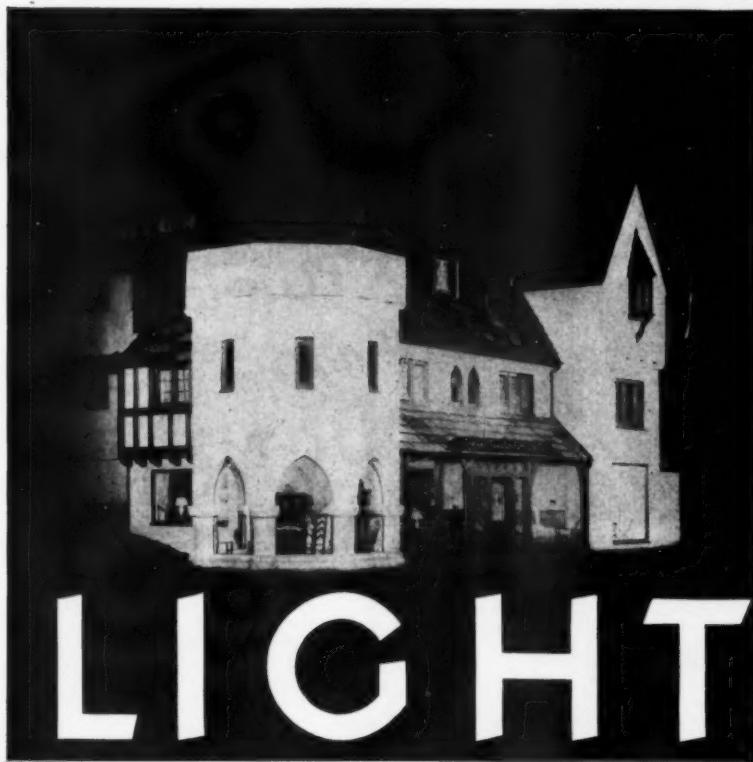
T 79290 **Westinghouse**
Quality workmanship guarantees every Westinghouse product



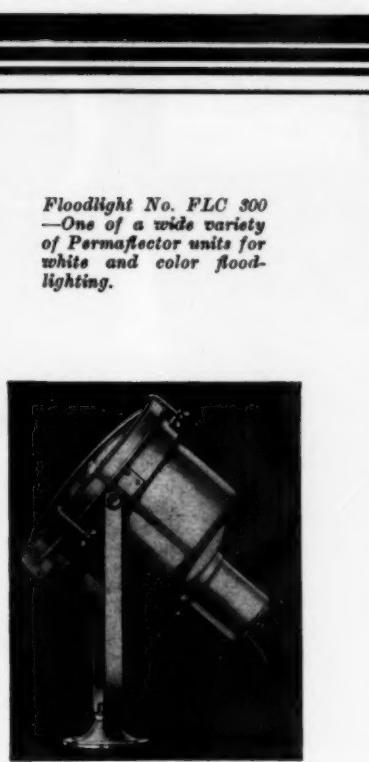
MAIL THE COUPON

Westinghouse Electric & Manufacturing Company
Room 2-N—East Pittsburgh, Pa.
Gentlemen: Please send me a copy of C. 1947.

Name
Company
Address
City State EC 8-32



LICHT



Floodlight No. FLC 300
—One of a wide variety
of Permaflector units for
white and color flood-
lighting.

a big factor in business

Modern business demands more and more light. Every city has its "Great White Way". Illumination is the index of progress. The picture above shows the beautiful effect of Permaflector Flood Lighting on a business building.

Contractors who have any problem of lighting—exterior or interior—are offered the benefits of our twenty years' experience in fields of special illumination—flood lighting, show window lighting, cove lighting, or indirect lighting.

Permaflector engineering insures correct principle and the economical service which permanence of reflecting surface makes possible.

Write for catalog also the Permaflector Magazine

PITTSBURGH REFLECTOR COMPANY
OLIVER BUILDING

Pittsburgh, Pa.





NEW DAY-STEEL PULLEYS

for use with Dayton Cog-Belts

The introduction of the new Day-Steel Pulleys gives you an unprecedented opportunity to get the bulk of this type of business in your territory. It's a Drive heretofore unapproached in those essentials which appeal most to buyers of power transmission equipment... offering new economy, new efficiency, new standards of performance. Now you can offer your clientele a new and better Drive, which is—

—from 30% to 50% lower in price—offering tremendous savings in initial cost and in maintenance expense.

—accurately formed from heavy-gauge pressed-steel, strongly welded both at

the rim and at the web—assuring maximum strength and ruggedness with a substantial reduction in weight.

—rigidly assembled with a hub of unique design—providing true running and accurate balance.

—finished in high quality aluminum—providing complete protection and outstanding appearance.

—made with 1 to 5 grooves—for all ratings of 7 1/2 h.p. and below—all speed ratios—all center distances.

And to make sales still easier, these new Day-Steel Pulleys are individually packaged, and include interchangeable bushings for any size

bore—the first time that drives have ever been offered in such a convenient and attractive way. They will appeal to all who are interested in a drive which combines the qualities of economy,

efficiency and attractive appearance. From every standpoint, there's no drive to equal the new Day-Steel Pulleys used in connection with Dayton Cog-Belts... an unusual opportunity for distributors.

Why not get the complete proposition? We'll be glad to send it to you. Just ask for Bulletin No. 110, which gives all the facts.



THE DAYTON RUBBER MANUFACTURING CO., Dayton, Ohio
Factory Distributors in Principal Cities and all Westinghouse Electric and Mfg. Company Sales Offices

Dayton
COG-BELT DRIVES

NEW G-E LINE OF



30 AMP. FLUSH SWITCHES

(National Electrical Code Standard)

● DESIGNED FOR HEAVY DUTY

To meet the demand for a higher capacity switch, General Electric has developed a line of 30 amp. flush switches in single pole, double pole, and three way types.

The mechanism is totally enclosed. The blades are of a heavy cross section and on each moving blade are two arc snuffers. As the blade leaves the contact these snuffers flash by the end of the contact and snuff the arc.

G-E 30 amp. switches are made extra heavy for the duty that they must perform. Binding screws are large . . . will accommodate #8 wire which is required for 30 ampere carrying capacity. These new heavy duty switches will not fit a shallow switch box, but can be accommodated in a deep switch box or an outlet box with a plaster cover.

Your nearest G-E Merchandise Distributor can supply you with G-E 30 amp. flush switches or write Section D328, General Electric Co., Merchandise Dept., Bridgeport, Conn.

Tune in! Join the "G-E Circle" every weekday noon,
D. S. T. (except Saturday) Nationwide N. B. C. Network.

GENERAL ELECTRIC
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MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

